Contractors and Engineers Monthly

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DIVISION OF TECHNICAL ASSISTANCE

BOARD

ROAD CONVENTIONS

Highlights Of This Issue

- **No Haste or Waste**
  This was the motto of an unusually well-organized concrete paving job in Mississippi where the pace set by a dual-drum paver was maintained by the finishers and crew with efficiency and without haste or confusion.
  See page 2.
- **Light Your Snow Plows**
  In an effort to eliminate accidents during snow plowing, many of the state highway departments have developed distinctive methods of lighting their snow-plow units. See pages 4 and 5.
- **Cement-Stabilized Road**
  Maryland's first portland-cement-stabilized road, constructed last year after careful study and experimentation with soils, has proved so successful that this state is planning more of the same type of work. See page 11.
- **County Road-Mix Work**
  Harrison County, Miss., is carrying on a successful program of road-mix highway work by providing an adequate, solid, well-drained and well-shaped base to insure stability. See page 19.
- **Safety Lighting Successful**
  A program of safety lighting on heavily traveled highways in New Jersey, launched in 1937, resulted in a decrease of 37 per cent in night accidents in 1938, at a cost of less than $500 per person saved from injury or death.
  See page 24.
- **Highway Maintenance Depot**
  An important part of any highway department's plant is the maintenance depot where equipment is stored and cared for. A recently constructed depot at Craig, Colorado, is described in this issue. See page 34.

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The Asphalt Conference, ARBA and AGC to Meet in California During February and March

✦ CONVENTION roads lead westward to the Pacific Coast in 1939, it seems, for during February and March three important conventions for road builders and members of the construction industry will be held in California.

The first of these is the Twelfth National Asphalt Conference under the auspices of The Asphalt Institute at the Biltmore Hotel, Los Angeles, during the week of February 27. The following week, beginning March 5, the American Road Builders' Association and the Associated General Contractors of America will hold their annual conventions concurrently in San Francisco at the same time as the annual meetings of the Associated Equipment Distributors, the Western Association of State Highway Officials and the California Association of County Supervisors.

ARBA Meeting and Exhibit

Special to Contractors and Engineers Monthly

SAN FRANCISCO, Feb. 14, 1939—"I'm heading for the Highway Roundup" will soon be the slogan of all wise and forward-looking road builders. Twenty thousand delegates from the forty-eight states and twenty-five foreign countries are expected to fly, sail, drive and ride to this Pacific Coast city for the 36th annual Convention and Highway Exhibit of the American Road Builders' Association, March 7-10, 1939.

When they arrive they will find that

(Concluded on page 8)

Pump Unit Placed Concrete In Coolidge Bridge Piers

(Photos on page 52)

C. & E. M. Photo

The Construction Trestle for the New Coolidge Bridge Which Will Replace the Old Highway Bridge at the Left

✦ THE old steel highway bridge over the Connecticut River between Northampton and Hadley, Mass., is doomed like the street railway bridge which paralleled it and was abandoned several years ago. A new majestic steel structure on concrete piers is now rapidly approaching completion as a memorial to the late Calvin Coolidge, former President of the United States, whose home was in Northampton. The bridge consists of two abutments a piers and has a total length of 0.27 mile and a roadway width of 40 feet. The center span is 296 feet, both the adjacent spans are 260 feet and the two end spans are 203 feet. The abutments are referred to by the names of the cities on either bank and the piers are numbered from the Northampton end.

T. Stuart & Son Co. Used Effective Methods on the Substructure of 1,400-Foot Connecticut River Bridge

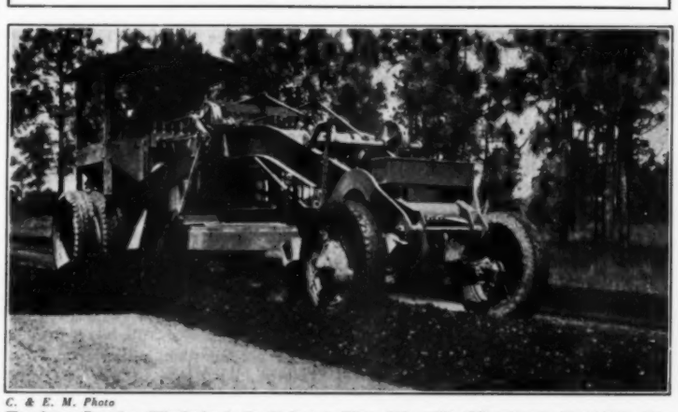
Construction Trestle

The method of approaching the construction of this long steel bridge is of particular interest. The new structure runs alongside and just downstream of the old street railway bridge which stood between the new and the old highway bridges. The contractor demolished a portion of the street railway bridge from the Northampton end and immediately began the construction of a temporary timber trestle extending from the Northampton shore to Pier 3. As each pier was under construction, an offset of the trestle was extended alongside the pier, permitting the operations to be handled easily. At Piers 1 and 2 the offset was run out the full length of the piers, while at Pier 3 it was run out only one-half the length of the pier. One of the reasons for stopping the trestle at Pier 3 was that it would have obstructed the main river channel which is used moderately by pleasure craft.

The temporary trestle consisted of 6 to 8-pile bents spaced 22 feet apart with caps of 12 x 12's and 18-inch I-beam stringers, and was decked with 4-inch planks. The roadway width on the trestle was 12 feet, permitting the passage of a large Bucyrus-Erie steam crane which handled most of the heavy work in the construction of the substructure. At the sides of the trestle were 16 x 16-inch timber guards or curbs bolted to the decking and caps. Along the outside of the north guard the Pumpcrete line was carried, placing it out of the way of traffic but still readily accessible for cleaning and maintenance.

(Continued on page 12)

ROAD MIX ON COUNTY HIGHWAY



C. & E. M. Photo

Harrison County, Mississippi, Is Doing a Fine Job with Bituminous Road-Mix Construction to Improve Roads Connecting with State Highways. See Page 19.

Good Organization And Equipment Set Pace In Concreting

No Haste or Confusion as Dual-Drum Paver with Two Finishing Machines Laid Over 1,800 Feet Per Day

(*Photo on page 52*)

✦ A NEW 34-E dual-drum paver, an ample, well-synchronized labor organization, and a longitudinal finisher behind the usual transverse finishing machine enabled Ziegler Construction Co. of Nashville, Tenn., to put down better than 1,800 feet of 7-5-7-inch slab in a 10-hour day on its recent 10.62-mile concrete paving contract in Mississippi between Nettleton and Verona. With a well-planned labor organization the contractor was not hurried in any part of the work but proceeded right down the road with every section of the work going along at a reasonable pace.

The Batching Plant—Bulk Cement

The first location for the batching plant was at Shannon, about the middle of the job, and then for the last 3 miles of paving toward Nettleton the plant was moved to that town. By choosing these locations the truck haul was 5 miles maximum, requiring seventeen trucks with a minimum of ten. Two-batch trucks were used, all hired from local owners.

The sand and gravel for the batches were received by rail on a siding at both locations and the sand was stockpiled in accordance with the Mississippi specifications to secure a uniform moisture content throughout the batches. A Koehring crane with a 35-foot boom and a Hayward clamshell unloaded the gondola cars in a very convenient set-up. A runway was made between the track and the batching plant by filling between two barricades. On this runway the crane was able to use its 35-foot boom and also to run back and forth between the stockpile of sand and the gravel cars to be unloaded during the day. The batching plant consisted of Johnson batchers on a Blaw-Knox bin. The trucks backed under the batchers for their loads, with the metal containers for the bulk cement closed. Then they pulled out and went in the direction away from the road for the load of bulk cement which was placed in the containers.

The contractor kept four or five cars of bulk cement on the siding at all times during the dry weather and unloaded them one at a time, using three men in the car. Two broke down the compacted cement so that the third, using a Blaw-Knox 2-hand power shovel, could move the loose cement easily into the hopper above the spiral feed to the bucket elevator of the 100-barrel cement bin. At the bulk cement batching plant there were two men handling the placing of the proper weight of cement in the batch boxes. The top man weighed and dumped the batches and a man below placed the short metal pipe on the end of the canvas boot from the cement batcher in the batch box and then, as soon as the cement was delivered, removed it and pulled it up clear of the truck with a rope and pulley. It was hooked up out of the way when no trucks were under the batcher.

The batches as weighed out for the paver when this job was visited were: 2,261 pounds of gravel; 1,360 pounds of sand; and 611 pounds of cement.

Make-Ready on the Grade

The grade was roughed in with an RD6 pulling a Caterpillar 30 grader leaving the subgrade only 0.2 foot high. Then a Carr Formgrader was used to cut the form trench for the Blaw-Knox 7-inch steel forms with an 8-inch base. The trench was cleaned and the forms set by two form setters, two helpers and two laborers, after the line had been set from the stakes by one man ahead. Where there was any high grade as shown by checking with a string a Caterpillar Twenty-two pulling an Adams grader with a 6-foot blade and also a fresno were used before the subgrader was run over the forms. Also well ahead of the subgrader, two men cleaned and hand tamped the forms.

The subgrade was cut to true 7-5-7-inch cross section and the excess dirt removed from between the forms by a Blaw-Knox Flynn Surgrader with a ramp for the batch trucks to drive over toward the Blaw-Knox turntable. One man operated the Surgrader and two men swung the turntable. Behind the subgrader four men with a foreman lined the forms and retamped. One of

(*Continued on page 38*)

C. & E. M. Photo
Another Load of Hot Mix Delivered to the Jaeger Finisher for Spreading Between Forms

C. & E. M. Photo
A Well-Aligned Expansion Joint

"Widen and Surface" Keynote in the South

Blythe Bros. Const. Co. Hot-Mix and Road Crews Pull Together on 17.45-Mile Job in N. Carolina

✦ A 17.45-mile state project on U. S. 301 from Lumberton through Raynham, N. C., to the South Carolina line was only one of a dozen paving projects completed by Blythe Bros. Co. in the South during the summer of 1938. This project is of particular interest because the methods used and the plant employed were the same as on several other jobs to which the plant was moved from the U. S. 301 job. The old 16-foot bituminous concrete road 2 inches thick on a 4-inch concrete base with 1-foot headers had become very rough and was all too narrow for the traffic it was called upon to carry.

The Widening Strips

It was a simple matter to make the trenches for the widening strips with the device used by the superintendent. A Galion motor grader was rigged with a 27-inch blade to cut the widening trench 24 inches wide and allowing 3 inches for the forms. The blade was dropped the correct 3½ inches below the pavement for the trench as specified and the grader was run on the pavement for the full length of the job, down one side and back the other. To insure a firm subgrade the trench was thoroughly rolled with a Galion trench roller, giving compaction equivalent to that of a 10-ton roller.

The forms used were 3 x 6-inch pine staked with 24-inch stakes of 2 x 4's cut diagonally. The stakes were nailed to the forms with 30d nails and were left in place after the entire paving was completed. A blade was set on the front of the spreader box to trim the subgrade to exact depth and a man was kept at each side to shovel out the excess dirt. The Newell spreader box was intended for spreading the full width of the road but for this job the center was blocked off and openings left at the ends for the placing of the material. The box was pulled along the forms by wire cables attached to a T-40 TracTracTor. The metal pans onto which the trucks dumped the loads of sand asphalt were sloped to the sides to assist in placing the hot mix. The 3½ inches of material was rolled from the spread thickness which was ¼ inch above the forms and fully compacted to the elevation of the pavement. This was followed with an 8-ton Buffalo-Springfield gas roller for the final compaction.

The Hot-Mix Plant

The contractor set up his Simplicity System hot-mix plant at Raynham, in the exact middle of the 17-mile job, on a siding of the Atlantic Coast Line railroad over whose lines the Standard of

(*Continued on page 15*)

C. & E. M. Photo
The View Aft from the Top Deck of the Paver

Vermont Grading Provides Variety

Lane Construction Corp. Worked in Rock, Earth And Muck on 5.08-Mile Job near Underhill

✦ THE best way to appreciate the 5.08-mile grading project FAP 98-H which the Lane Construction Corp. of Meriden, Conn., completed between June 21 and October 1, 1938, is to take a ride over it with us from north to south and see the variety of materials encountered, from the hard rock at the north end to the earth and muck at the south end.

The Rock Cuts

Up at the north end beyond the last rock cut, the utility compressor, a Gardner-Denver self-powered 120-foot unit mounted on a Chevrolet truck, was used to drive an I-R jackhammer to demolish the easterly headwalls of an old culvert which had to be extended through the new fill. This same machine did blockholing and the 101 other jobs a utility machine is called upon to tackle simply because it can move around so quickly from one part of the job to another.

Just south of this in the first of the rock cuts a Sullivan 310-foot compressor was working with a Gardner-Denver drifter and wagon drill. The holes ran from 4 to 16 feet in depth and were made with Timken and Sullivan detachable bits from 2¾ inches down. The holes were loaded with American 40 per cent dynamite. After shooting, the Bucyrus-Erie 37B moved in, alternating between two rock cuts and loading to four Linn tractors equipped with Cummins diesel engines. These 5-yard machines were used on hauls up to 4,000

(*Concluded on page 36*)

C. & E. M. Photo
The Key to Successful Operation—The Pyrometer Used to Regulate the Cold Sand Elevator Feed

A 12-mile section of U. S. Highway No. 40, west of Denver, Colo., which has a Road-mix type surface, constructed with TEXACO SC Surfacing Material No. 3 and crushed rock aggregate.

MILLION-GALLON ROAD PROJECT— *OR* TWO-DRUM MAINTENANCE JOB

A million gallons of Cutback Asphalt for a State Highway, or a few drums of Emulsified Asphalt for a small patching job—

Your own Asphalt needs may fit into either of these two classes, or anywhere between.

The point is that TEXACO Asphalt plants are geared to handle the million-gallon order and the order for a few drums with the same smooth-running efficiency.

Talk Asphalt with TEXACO the next time one of your jobs calls for Asphalt Cement, Cutback Asphalt, Emulsified Asphalt or Asphalt Surfacing Material. A request to our nearest office will bring your local TEXACO Asphalt Field Man to you at your convenience.

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The Challenge in 41 States

By MURRAY D. VAN WAGONER

President, American Road Builders' Association; Michigan State Highway Commissioner

Forty-one states of the Union are today without any adequate guaranty that highway taxes will be used for highways and not be dissipated into any number of diversion channels. Presented in another manner, this means that there are only seven states having a constitutional bar against diversion. By past experience, highway authorities and friends of good roads know that a constitutional provision is the *only* effective and absolute guaranty that can be established against this nefarious evil.

The gravity of the situation is reflected not only in the enormous increase in diversion through the years until it now takes a toll of more than $170,000,000 a year away from the highways of our country although this alone is enough to cause profound concern. Just as important, however, is the realization that highway authorities are facing more and more competition for tax money raised for highway purposes. Never before have the states faced such tremendous demands for relief funds. Old age assistance, unemployment compensation, and other social security needs have added unprecedented fiscal burdens, not only upon the Federal government but likewise on state and local governments.

On the other hand, new sources of taxation are no more popular today than ever before. One can extend every sympathy to legislative and executive agencies in the several states faced with these tremendous needs for more revenue. At the same time, highway authorities cannot blind themselves to the probable target at which these officials will aim. Reluctant to turn to new taxes, they are quite apt to take the easiest way out. The easiest way has always been the motorist's tax pennies. He has too long been an ever-patient taxpayer. He has seldom taken the trouble to work up any sort of balance sheet to see how his highway taxes were being spent.

The result may well be that states which have enjoyed absolute or comparative freedom from diversion will witness successful attempts to use highway money for general governmental purposes. Anti-diversion statutes will give no full protection at such a crisis because laws can be repealed as easily as they can be enacted. And, even when enacted, there is no complete confidence that they will always be observed to the letter.

Progress of the highway planning surveys in most of the forty-eight states is an additional stimulus for a widespread and quick thrust against the diversion evil. Information from these surveys should furnish highway authorities with the most effective weapon at their disposal for an intelligent administration of the highways for they should eliminate the guess work of the past in connection with highway design, location, construction, maintenance, and administration.

But, for this information to yield maximum benefits, highway administrators must have assured sources of revenue to rely upon. No effective planning can be done if these sources are continually jeopardized by the threat of or actual diversion. The sources on which administrators must rely are those taxes paid exclusively by motorists—gasoline and motor vehicle license plate taxes.

The picture is not altogether without its silver lining. The President of the United States and the Congress have plainly gone on record against diversion in the enactment of Hayden-Cartwright road legislation. The mere fact that seven states have adopted constitutional amendments against diversion is encouraging in itself.

Of more significance than this list of seven states is the fact that such an amendment was adopted by overwhelming majorities in three of the states last November. No one can properly evaluate the action of the voters in those three states in its future contribution to the anti-diversion movement. Motorists have shown an overwhelming desire to write this protection into their constitutions when given the opportunity, after an intelligent campaign of education. Once they realize the full meaning of this issue, there can be no doubt as to their answer.

It is up to the friends of good roads in the other forty-one states to give their motorists this opportunity. The quicker they accept this challenge, the better it will be for highway administrators, the highway industry, and highway users throughout America.

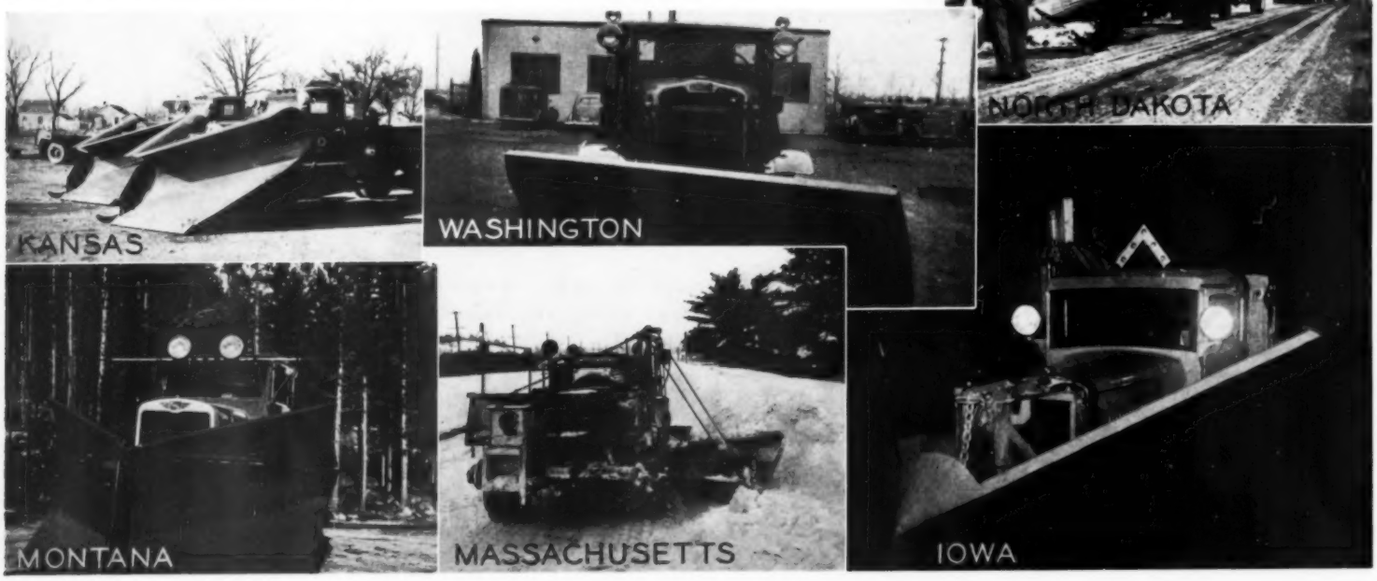
New Book on Welded Steel Construction

A new manual for the design, detailing, fabrication and erection of welded steel buildings, bridges and other steel structures has recently been prepared by Robert S. Hale, Architect, Consulting Structural Engineer, Construction Engineer for the U. S. Treasury Department, and Member of the American Welding Society. Finding a need for a "working knowledge" of welded steel construction, the author has provided a condensed book of study and reference on this subject. It is not a treatise on the welding art or the science of construction but is intended as a simple, concise exposition for architects, engineers, fabricators, contractors, welders, estimators, students and others who have a general knowledge of plans and structural engineering or welding.

The chapters cover such subjects as a review of the reasons for using welded steel construction, the principles of welding, design, application of design principles, drawings and details, estimating costs, fabrication and erection, inspection and testing, and conclusions from experience.

Copies of this volume "Welded Steel Construction" may be secured from the Pitman Publishing Corp., 2 W. 45th St., New York City, or from CONTRACTORS AND ENGINEERS MONTHLY. Price: $3.00.

SPECIAL LIGHTING ON SNOW-PLOW UNITS AIDS SAFETY ON THE HIGHWAYS



Lighting Snow Plows During Night Storms

"Traveling Christmas Tree" With Distinctive Lighting Recognized by Public Cuts Down Accidents

(*Photos on page 4*)

✦ ONE of the many problems involved in snow removal is that of safety. Any vehicle of large proportions moving at a slow pace along the highway is a potential menace to the traveling pubic and during a snow storm, when visibility is particularly poor, especial care must be taken to avoid accidents. Collisions with snow removal equipment in many states have resulted in injuries to people, the ensuing delays in the important work of snow plowing, and the inevitable law suits.

As a result, considerable thought has been given by state highway departments to the subject of lights on snow removal equipment. These lights must serve two purposes: first, they must make it possible for the operators to see what they are doing, and in addition, they must make it possible for travelers on the highway to see the equipment and recognize it as such. The key to the accomplishment of this second purpose lies not merely in adequate lighting but in making the lighting so distinctive that the snow plow can not be mistaken or its size and speed misjudged.

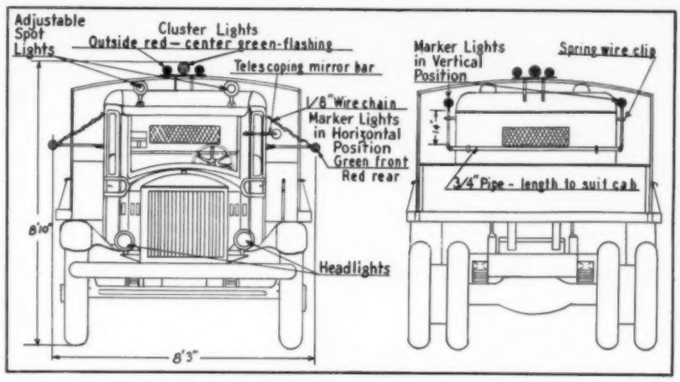
A number of states have developed special lighting for their snow removal equipment which seems to accomplish this purpose. Connecticut, for example, in addition to the regular lights such as headlights, tail-lights, spotlights, directional lights and button reflectors required by law, uses three groups of special lights on all snow removal and sanding trucks. The first of these are two adjustable spotlights of 32 candlepower each, mounted on the truck cab at a point near the outer front corner. These lights can be focused in any direction and can be used as headlights where the regular headlights are not of sufficient height, due to the snow plows on the front of the trucks. They are also used as ditch lights and are directed on sand stockpiles when loading sanding trucks at night. The second of these special lights are two marker lights of 6 candlepower, one on each side of the cab at the rear, mounted on hinged supporting pipe brackets so that they can be placed in vertical position when not in use and horizontally when in use. These lights have red lenses in the rear and green in the front. When placed in a horizontal position they show the extreme width of the truck and snow plow and are visible from either the front or rear of the vehicle. These lights have what is known as the beehive type of lenses which show when facing the vehicle from either the right or left side. One set of double-faced cluster lights is mounted on the cab roof approximately 55 inches above the truck body floor level, making these lights visible from the rear above the shelter which is provided for the men riding in the truck body. This set of three lights consists of two outer lights 3 inches in diameter and of 6 candlepower with red lenses front and rear, and a 32-candlepower center light, 4 inches in diameter, with a special flashing bulb of approximately 35 cycles per minute. Snow plows have button-type reflectors mounted on brackets on the left side of the plow, which show the edge of the plow on the center of the road. These reflectors are double faced and show both front and rear.

These lights are used only by the State Highway Department and no other vehicles are permitted to be lighted in the same manner. As a result, operators of motor vehicles immediately recognize Highway Department equipment and consequently proceed cautiously. When these lights were first installed, many motorists stopped the trucks to look over the lighting system, and all approved it. Since its trucks have been so equipped, no serious collisions have occurred, Henry Sturm of the Property Control Bureau of the Connecticut State Highway Department reports.

Special Lights Prove Effective

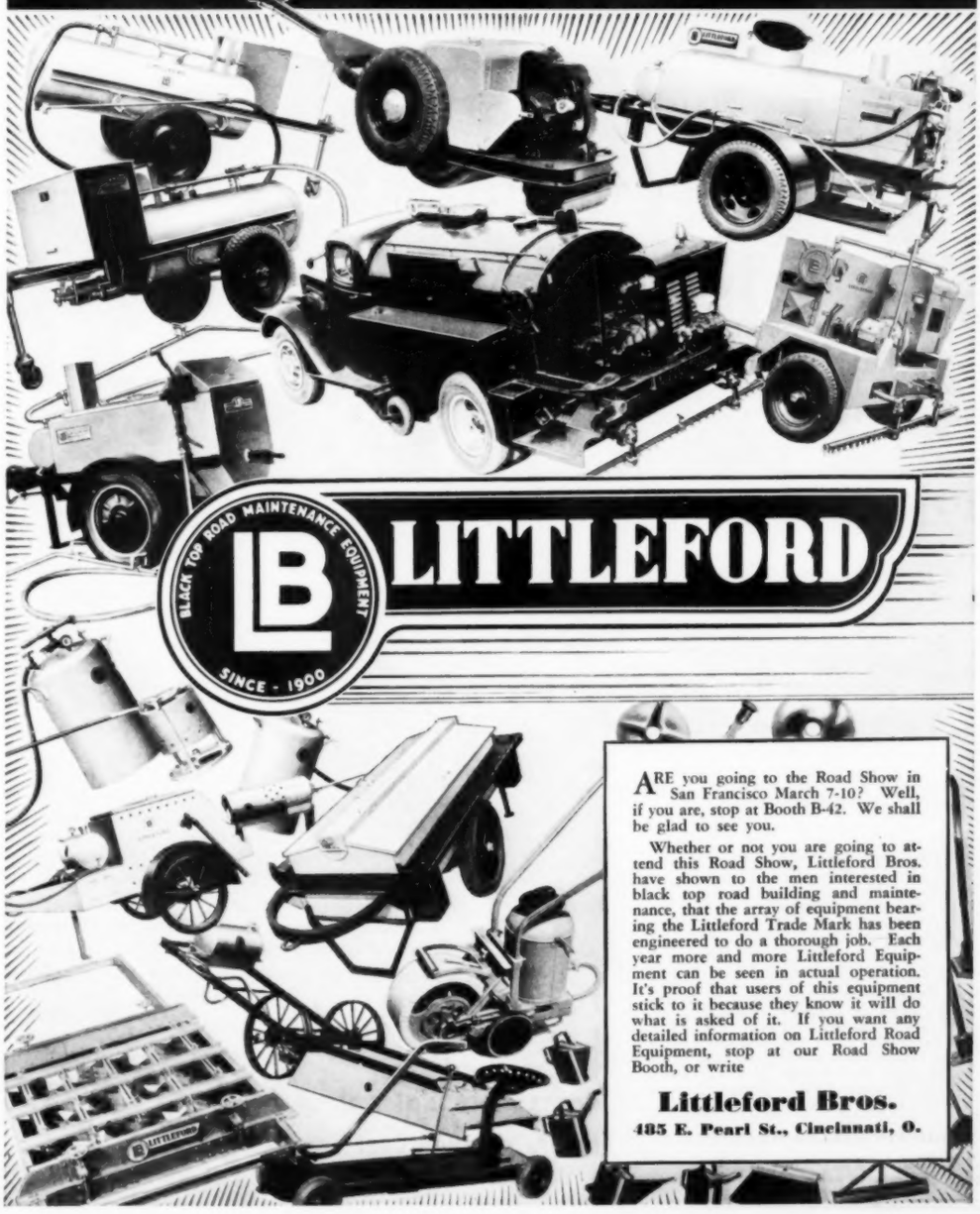
On Illinois state snow removal equipment, in addition to the standard truck headlights, tail lights, and the identification lights of three amber or green lights along the front of the cab and three red lights along the rear of the cab, two additional standard truck headlights are set at the top of the cab or high enough to clear the top of the snow plow. There is also a swivel-mounted marine spotlight, equipped with a red lens, on top of the rear of the cab which serves as a warning to traffic approaching from the rear as well as for illumination for the men who may be scattering cinders from the

(*Continued on page 20*)



Connecticut's Standard Plan of Lighting All Snow-Plow Units

"LITTLEFORD" will be at the ROAD SHOW



ARE you going to the Road Show in San Francisco March 7-10? Well, if you are, stop at Booth B-42. We shall be glad to see you.

Whether or not you are going to attend this Road Show, Littleford Bros. have shown to the men interested in black top road building and maintenance, that the array of equipment bearing the Littleford Trade Mark has been engineered to do a thorough job. Each year more and more Littleford Equipment can be seen in actual operation. It's proof that users of this equipment stick to it because they know it will do what is asked of it. If you want any detailed information on Littleford Road Equipment, stop at our Road Show Booth, or write

Littleford Bros.
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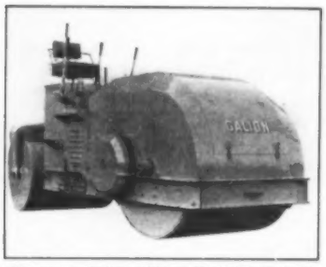

The New Galion 7-Ton Variable-Weight Tandem Roller

New Variable-Weight Tandem Road Rollers

Among the new models of road equipment for 1939 is the new Galion variable-weight tandem 5 to 8-ton roller just announced by the Galion Iron Works & Mfg. Co., Galion, Ohio. This roller has a metal weight of 5 tons but by water ballast can be increased to a 6, 7 or 8-ton unit as desired. The general design of this roller follows that of the heavier Galion tandem roller.

This new model has a 119-inch wheelbase, a rolling width of 50 inches, is 171 inches long, 87½ inches high and 65½ inches wide. Powered by a 6-cylinder 43-hp engine, it attains a road speed of 2.23 mph in low and 4.65 mph in high. It is equipped with a hydraulic steering device.

Complete information on these new Galion rollers may be secured by those interested direct from the manufacturer by mentioning this item or from this magazine.

A New Heavy-Duty Diesel Compressor

A [illegible]avy-duty diesel-engine-driven compressor, suitable for use in quarries, tunnel work, on drill barges, and similar service in independent or isolated plants, where economy is a prime consideration, has recently been announced by the Ingersoll-Rand Co., 11 Broadway, New York City. This Model XVO is entirely new in design and combines a horizontal heavy-duty double-acting compressor with a heavy-duty V-type four-cycle diesel engine in a single compact and comparatively light-weight unit operating at a moderate speed. Sizes are available for actual free air delivery ratings of 625, 935 and 1,250 cfm for 100-pound sea-level compression.

Detailed information on this new compressor is contained in a 16-page bulletin, Form 3072, copies of which may be secured direct from the manufacturer by mentioning this item.

Trucking Prominent On Telescope Job

Much has been published in the newspapers about the construction of the 200-inch telescope now being built by the California Institute of Technology for mounting on Mt. Palomar, 130 miles southeast of Los Angeles, Calif. One year hence, astronomers will peer back in time and see a nebula as it was a billion years ago and make records, on photographic and spectroscopic plates, of light which has traveled approximately five sextillion miles.

The Observatory on Mount Palomar, Calif., the Home of the World's Largest Telescope, Nears Completion

The construction of the huge observatory, the electric light plant and the water supply system on this 6,100-foot mountain has offered serious transportation difficulties for materials and supplies for construction. Ford V-8 trucks carried the initial supplies to the summit in 1936, negotiating primitive brush-covered cattle roads deeply scarred by mountain storms and landslides. The winter of 1936-37 brought over 5 feet of snow to hinder traffic; yet hauling was continued, using tire chains, tow chains and hydraulic jacks as standard equipment.

Next they hauled 2,500 cubic yards of sand from a mountain creek bed 5 miles away and over 1,000 tons of crushed rock from a quarry 55 miles distant. They have hauled from sea level to mountain top, going up the grade the first 35 miles in high gear, the next 8 in second and the last 12 miles in compound low over a series of switch-backs which carried them up the precipitous side of the mountain. It has required an average of six hours for the trucks to complete the 110-mile round trip and they frequently make three trips a day, with the drivers working in shifts.

Men Who Are Doing Things

Meet Superintendent Pat Jordan, of the Poirier-McLane Corp., now engaged on the First Contract of the 36-mile, $28,000,000 Circumferential Parkway, linking the three Boroughs of the Bronx, Queens and Brooklyn in New York City.

Mr. Jordan has for the last 20 years been in the employ of Poirier-McLane Corp., supervising construction of sections of the Subway, Triboro Bridge, West Side Elevated Highway, Mid-Town Tunnel, and other major contracts in the New York Metropolitan District.

Mr. Jordan, with years of experience operating wellpoint systems is using two Griffin Wellpoint Systems on his present job to unwater the foundations. His last wet job, The Great Neck Sewage Treatment Plant Project, was also dewatered with a Griffin Wellpoint System.

GRIFFIN WELLPOINT CORP.
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Telephone Melrose 8-7704-5

BIG YARDAGE DIRT CHEAP

DIESEL LORAIN-40 DRAGLINE handles 120 yds. per hr. on 1½ gal. of fuel oil

● This ¾-yd. Lorain-40 of T. Jensen's, Stockton, Calif., is shown riding herd on a 60,000-yd. levee job along the San Jauquin River for the El Soeyo Ranch. A roundup of performance facts shows that this dragline moved an average of 1000 to 1200 yds. per 10-hour day; consumed 1⅛ to 1½ gallons of fuel oil per hour; had a drag cable life of 20,000 yds. And just to top off a perfect record the Lorain-40 handled the 60,000 yds. of difficult digging without a single time out for repairs.

Now for the reasons back of the record. First, a crawler with 30" wide treads provides both low ground pressures and sure footing. Second, the patented dragline fairlead eliminates costly cable wear. Third, the thrifty Caterpillar Diesel engine gives greater power at lower cost. And fourth, the Center Drive turntable is balanced to give the minimum weight and the maximum stability—which permits this 30,000-lb. unit to handle a full ¾-yd. bucket speedily and efficiently.

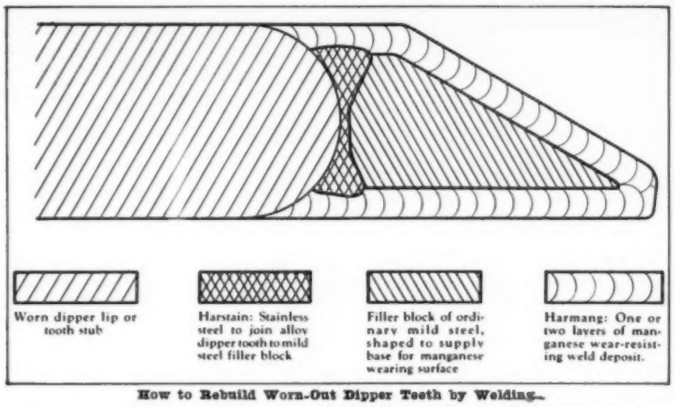
These and many other features make the Diesel Lorain-40 an equally outstanding performer whether used as a dragline, shovel, crane, or clamshell. Write for catalog today.

UNIVERSAL CRANE DIVISION • THE THEW SHOVEL COMPANY
LORAIN, OHIO

THEW CENTER DRIVE

"Moves More Material, Faster, at Lower Cost"

¾ YD LORAIN-40


Worn dipper lip or tooth stub
Harstain: Stainless steel to join alloy dipper tooth to mild steel filler block
Filler block of ordinary mild steel, shaped to supply base for manganese wearing surface
Harmang: One or two layers of manganese wear-resisting weld deposit.

How to Rebuild Worn-Out Dipper Teeth by Welding.

Worn Dipper Teeth Renewed by Welding

A simple and low-cost way of building up worn dipper lips and teeth right in the field, thus saving the expense of buying new parts and cutting lost time to a minimum, is reported by F. J. Hirner of the Harnischfeger Corp. This can be accomplished by the use of welding on the job, using one of the many available portable welding outfits.

As practically all excavator buckets are equipped with lips and teeth made out of some type of manganese wear-resisting steels, it is advisable in building up these manganese steel sections to use a coated electrode having manganese steel properties, such as the Smootharc Harmang. While the data given by Mr. Hirner applies specifically for use with this P & H electrode, it applies also to any electrode having approximately 11 to 14 per cent manganese, 3½ to 4½ per cent nickel, and approximately 1 per cent carbon, by chemical analysis. In the "as-welded" state, this high manganese deposit is soft and ductile, but cold working such as hammering, peening, etc., decomposes the soft sustenite to extremely hard martensite and when once formed, this martensitic layer offers resistance to impact and abrasion.

In this type of work, the polarity is reversed, the electrode being positive and the work negative. A medium-length arc is recommended, of 24 to 26 volts. The current rates should be 6-100 amperes for the ⅛-inch size, 90-150 amperes for the 5/32-inch, 120-200 amperes for 3/16-inch and 170-260 amperes for the ¼-inch. These welding currents are general and should be adjusted in accordance with the particular application and the type of electrode used. Flatter beads and greater penetration are produced in the high heats, although care should be taken to avoid the use of excessive welding heat.

The manganese steel surface to be built up should be divided into areas approximately 1½-inch square, and the amount of metal deposited at one time should be confined to this area. A rather wide bead, applied in a semi-circular motion, is recommended. No more than 3/16-inch thickness should be deposited at one time. Vigorous peening of the hot bead with an air or hand hammer is essential to relieve shrinkage stresses and to increase surface hardness. While the deposit should be hammered smooth, it is important not to do this to a point where the metal starts to flake, indicating that the deposit has reached the point of brittleness.

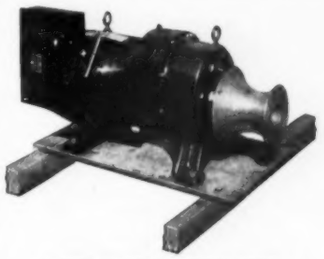
The diagram above shows how the weld metal should be applied, and if this procedure is followed, the work can be done expertly and inexpensively on the job.

New Cummins Sales Manager

Announcement has been made by P. E. Letsinger of the Cummins Engine Co., Columbus, Ind., manufacturer of automotive, industrial and marine diesel engines, of the promotion of David Buttles to the position of Sales Manager, with headquarters at the home office in Columbus. For the past four years, Mr. Buttles has been factory sales and service manager for the eleven western states, previous to which he was service manager for a large diesel truck fleet on the Pacific Coast.

Small Capstan Hoist A Convenient Tool

The roofer's capstan hoist made by Sasgen Derrick Co., 3101 W. Grand Ave., Chicago, Ill., is a convenient unit which may be used for many purposes on construction jobs where 60-cycle current is available, even being used on the standard electric light circuit. The hoist is operated by wrapping the hoisting rope several times around the horizontal capstan, depending upon the load to be hoisted. To raise the load the free end of the rope is pulled tight, causing the rope to snub on the capstan. As the load is raised the operator pulls the free rope toward him. The load can be stopped and held at any point by decreasing the pull on the free end, so that it slips on the capstan. To lower the load the rope is held taut and the free end run out by the operator. Thus the load can be controlled by the operator at all times. The wraps of rope around the capstan act as a positive clutch and brake.



Sasgen Electric Capstan Hoist

The Sasgen roofer's capstan hoist has a maximum capacity of 400 pounds with a line speed of 150 feet per minute. It is built with a 2-hp double-geared motor in two types; a 3-phase 60-cycle unit or a single-phase 60-cycle unit which is the one which may be used on an electric light circuit.

MOTO-MIXERS AVERAGED
64+ YARD MILES PER HOUR, PER TRUCK!

THIS KIND OF RECORD-SMASHING PERFORMANCE KEEPS YOU IN THE "LOW BIDDER BRACKET!"

● You don't have to worry about too high bids and a poor record of "jobs bid—jobs awarded" when you figure the cost of mixing and hauling your concrete with Rex Moto-Mixers. Many, many job records testify to their ability to keep your bid figures low—and to keep them low with safety! Their consistent high-speed performance and downright rock-bottom economy can give you real aid in your job of bidding on more concrete jobs—getting more of them—and doing them at a real profit.

Before that next concrete job, check up on Rex Moto-Mixers. See how they can keep you in the "low bidder bracket!"

BEFORE YOU BID OR BUY—SEE FOR YOURSELF WHY MOTO-MIXERS LEAD THE FIELD

Check these exclusive features:

1. Rex single cone-end mixing drum: Facilitates rapid loading, gives natural end to end mixing action.
2. Rex positive, flexible chain drive: Absorbs all shocks and twists; acknowledged most efficient means of transferring power to heavily loaded drum.
3. Rex no-flood water tank: Eliminates the truck-driver elements from water control—measures exact amount of water for each batch, saving weight, preventing spoiled batches.
4. Low load center and light weight: Moto-Mixers are several hundred pounds lighter than others of their size, yet they are better balanced, easier to handle, built for longer years of service.

Send for the new Moto-Mixer Catalog

REX
MOTO-MIXERS

CHAIN BELT COMPANY
1666 W. Bruce Street, Milwaukee, Wis.

Please send me a copy of "Payloads" which tells about the Rex Four-Profit Plan.

Firm Name .....
By (Title) .....
Address .....
City ..... *State* .....

Conventions

(*Continued from page 1*)

there is "never a dull moment" at the Golden Gate. Already preparations for the conclave are well under way in the Civic Auditorium, where all convention sessions and the highway exhibit will be held. "Highways of Tomorrow" is the keynote of the meeting. In keeping with this theme, the auditorium has been decorated to represent a model super-highway, complete with overpasses and underpasses. Within the exhibit booths will be set up the machines and materials that will be used to build these roads of the future. The U. S. Bureau of Public Roads and several of the western states will stage educational exhibits. Models of highway design will demonstrate some of the ideas for our "highways of tomorrow."

Super-highway legislation will be given important consideration by the Congress now in session and convention sessions will, therefore, devote special attention to the demand for super-roads and the economic possibilities of constructing a modern highway system. The convention program will include special sessions concerning soil stabilization, safe highways, drainage, highway planning, diversion, elevated highways, legislation, finance and administration. Contractors, municipal, county and state highway officials, engineering college faculty members, highway planners and Pan-American and European road builders will find due consideration given to their special problems.

This is the association's first convention-exhibit on the West Coast and a record attendance from the eleven western states and Texas is predicted. The unusual opportunity presented by this Convention-Highway Exhibit to combine a vacation on the Pacific Coast with attendance at the big event of the highway year insures the presence of equally large delegations from the East, North and South. Hotel reservations, which are pouring in daily to the ARBA Housing Committee in the Civic Auditorium, as well as train and plane reservations, bear out these expectations.

Leading the list of leisure-time activities that will be in full swing during the four days of the ARBA meeting is the Golden Gate International Exposition, the $50,000,000 World's Fair of the West. This colorful, impressive "Pageant of the Pacific" will, without doubt, prove a major drawing card for conventionites.

The list of other feature attractions which await ARBA members in this metropolis could go on and on. Pleasure and profit without limit are in store for the road builders who heed Horace Greeley's advice and "Go West" in March.

Asphalt Conference

LOS ANGELES—Twenty years of progress in highway construction, with analysis of present materials, methods and equipment, will be the theme of the Twelfth National Asphalt Conference which will be opened by Thomas H. MacDonald, Chief of the U. S. Bureau of Public Roads.

The remarkable development of road equipment from hand tools to present-day machines which pick up materials, mix and lay modern pavements in one operation will be presented in two sessions presided over by the Bureau's Senior Highway Engineer, J. L. Harrison. Col. Bernard E. Gray, Chief Engineer of The Asphalt Institute, and Earl Withycombe, Assistant State Construction Engineer of California, will direct two sessions on methods, ranging from waterproofing and stabilizing subgrade through modern high-type pavements. Materials will be dealt with in two sessions in charge of Prevost Hubbard, Chemical Engineer of the Institute, and N. F. McCoy, Senior Engineer of the Bureau of Public Roads. A. T. Goldbeck, Director, Bureau of Engineering of the National Crushed Stone Association and Stanton Walker, Director of Engineering of the National Sand and Gravel Association, will present the important subject of mineral aggregates. Many other outstanding engineers of the United States and Canada will present papers and participate in the discussions.

AGC Convention

SAN FRANCISCO—The convention sessions of the Associated General Contractors of America will be confined to intense business sessions at which the program for the following year will be developed. The sessions will be so arranged that there will be ample time for the contractors to view the new developments in construction equipment displayed at the ARBA Highway Exhibit.

There will also be ample opportunity to visit the Golden Gate International Exposition and it is expected that the week of March 5 will be the biggest convention week of the entire Exposition year.

AED to Meet

On March 4, the Associated Equipment Distributors, whose Annual Meeting takes place in San Francisco March 4-6, will hold its business meeting and business session at the Sir Francis Drake Hotel, followed by the annual banquet in the evening which this year will commemmorate the twentieth anniversary of the AED. Sunday, March 5, will be AED Day at the Exposition, and Monday will be devoted to a joint meeting with the manufacturers and to the election of officers. A. F. Sersanous, President, will preside.

To take off the last layer of ice on a state highway, there is nothing better than an 8-foot blade on a motor grader, with a motor truck ahead to hold down the front end. With the blade tipped forward when the ice is slightly softened, remarkable results are secured, reported W. H. Root, Maintenance Engineer, Iowa State Highway Department, at the 1938 Highway Research Board meeting.

Charles E. Foote Dies

Charles E. Foote, President of The Foote Co., Inc., Nunda, N. Y., died at his home in Nunda December 31, 1938. Due to gradually failing health, Mr. Foote had not been active in the management of the company for some time. Starting as a contractor some 40 years ago, Mr. Foote and his brother, the late Chester T. Foote, carried on a contracting business in the summer time and in the winter experimented with gas engines. Out of this experimentation grew the first American concrete paver. Later the MultiFoote paver for concrete and the Adnun black-top paver for bituminous pavements were introduced and are now manufactured by this company.

The activity and management of The Foote Co. will continue as in the past.

DRAGLINES *and* TRUCKS HAVE TO HUMP!

because it's a **UNIVERSAL**

This compact gravel plant for straight line operation is making money for its owner, an Iowa contractor. It crushes, screens and loads; material passing through in a smooth, steady stream, keeping the dragline and the operator's trucks on the go all the time.

And Universals do it at the lowest operating cost and with a minimum of repairs, allowing their owners to operate at a profit on every job as Universal Crushers and Crushing Plants always do—because they've got the "guts" to stand up and grind it out even under the most constant use and even the most hard-to-crush materials.

Why can Universals crush greater capacities, faster, more uniformly and at a lower cost? Superior design, improved construction, longer lasting materials that result from a third of a century of engineering experience.

Universal has built crushing equipment exclusively since 1906. Over 50 combinations of Portable, Semi-Portable and Stationary Crushing, Screening, Loading and Washing Plants are available today—each the most profitable and productive of its type in the field. You can bank on a Universal! Write for new literature.

UNIVERSAL CRUSHER COMPANY 620 C Avenue West CEDAR RAPIDS, IOWA

UNIVERSAL

Hughes Made Secretary Of Highways in Penna.

Announcement has been made of the appointment of I. Lamont Hughes, former president of the Carnegie Steel Co., as Secretary of Highways for the Commonwealth of Pennsylvania. Mr. Hughes, the major portion of whose business career was spent in the steel industry, had a share in planning the consolidation of the Carnegie Steel Co. with the Illinois Steel Co. into the present Carnegie-Illinois Steel Corp. and was Executive Vice President of that company until his resignation in April, 1936.

Rubber Hose Data

The new Hose Data Book recently issued by New York Belting & Packing Co., 1 Market St., Passaic, N. J., is a compact volume containing valuable information on the selection, care and use of rubber hose for all types of service. It lists nearly sixty types of rubber hose used in construction and other industries; defines fundamental terms and explains their relationship to hose structures; gives suggestions for increasing the service life of hose; describes and illustrates the principal types of hose construction; and contains tables of recommended working pressures, including a frictional pressure drop and flow chart.

Copies may be secured from the manufacturer by mentioning this item.

Newhall Directs Sales For B. F. Goodrich Co.

Arthur B. Newhall, Watertown, Mass., has been elected Executive Vice President in full charge of all production and sales of The B. F. Goodrich Co., by the board of directors. He has also been appointed a member of the executive committee. Mr. Newhall is President and a director of the Hood Rubber Co. at Watertown, a wholly-owned subsidiary of the Goodrich Co.

S-O and L tractors hogging dirt out of a cut for Columbia County, Wisconsin. Says the foreman, "These tractors can't be beat for dirtmoving."

Dig Faster, Haul Faster, Dump Faster by Using Allis-Chalmers Tractors and Continental Scrapers

Get heaping loads quickly, even in gumbo or hardpan — without use of rippers — by combining Allis-Chalmers power with the exceptional digging ability of Continental scrapers. Take those heaping loads to the fill and return at speeds up to 564 feet per minute (nearly 100 feet faster than is possible with the next fastest big tractor.) Ease of handling and two-wheeled stability enable you to back and turn in close quarters and over rough ground, thus making it possible to end-dump the material exactly where you want it — around culverts or against bridge abutments, over embankments or on fills. You stay on top of muddy going — where heavier outfits and wheeled power bog down — because you have sure-footed traction and a scraper of extremely light draft. Ask your Allis-Chalmers dealer to show you how these fast-moving outfits can speed up your dirtmoving by digging, hauling and dumping faster.

ALLIS-CHALMERS POWER

TRACTORS — IT DOESN'T COST • IT PAYS — ENGINES • ROAD MACHINERY

TRACTOR DIVISION, MILWAUKEE, U.S.A.

Katolight 2-Cylinder Air-Cooled 2,000-Watt A-C Generator

New Small A-C Plant For Construction Jobs

A new 2-cylinder air-cooled 2,000-watt generating plant for producing standard 110-volt 60-cycle alternating current has just been announced by the Kato Engineering Co., Mankato, Minn. This small generator, designed for furnishing current on construction jobs, is self-excited and is available with remote control or full automatic control or may be started manually. It is 28 inches long, 18 inches wide, 23 inches high and weighs 327 pounds.

The engine has a very sensitive governor, providing close voltage regulation. It is equipped with a high-tension magneto, completely shielded with shielded spark plugs and wires and the generator is completely filtered. The dc winding has been designed specially to keep the commutator ripple to an unusually low point. The engine is furnished with either a 2½-gallon gravity tank or with a fuel pump.

Complete information on these small plants which can be used for furnishing light or power for electric tools on construction jobs or in state and county highway garages and shops may be secured direct from the manufacturer by mentioning this item or from this magazine.

Reflector Material For Highway Signs

A new development in processed metals and foils has recently been introduced by the Mir-O-Ray Division of the Arcturus Radio Tube Co., Newark, N. J., for use on highway signs, as well as for display purposes. The special panoramic mirror structure of Mir-O-Ray traps light from any source and from any angle. It gives a brilliant reflection day or night without cost for electric current. It is said to be resistant to the elements and rust, and to be particularly adaptable for highway signs and railway signals. It is supplied in sheets, strips, letters, numbers and characters.

Samples and literature will be supplied on request by the Arcturus Radio Tube Co., Newark, N. J., to readers mentioning this item.

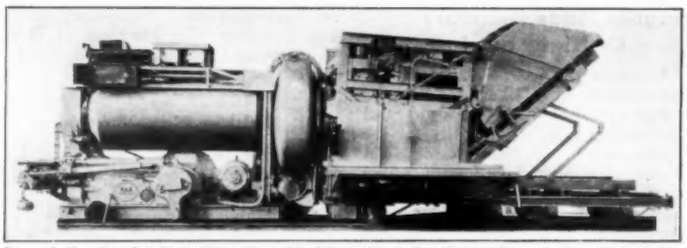
Novel Concrete Units For New 7-Mile Tunnel

Two specially designed and constructed tunnel lining machines, modeled along the general lines of the Rex tunnel machines used on the Metropolitan Water District project in Southern California, with definite modifications to adapt the equipment to work on a 12-foot tunnel, were recently shipped by the Chain Belt Co., Milwaukee, Wis., for concreting operations on the Gunpowder Falls-Montebello Tunnel, a part of the water supply system for Baltimore, Md. This tunnel which will extend a total length of 7 miles has an inside diameter of 12 feet and will require about 70,000 cubic yards of concrete. There will be two principal shafts from the surface through solid rock to the tunnel, each about 200 feet deep and spaced at 2-mile intervals from the city of Baltimore.

The accompanying illustration shows one of these Rex tunnel machines. There are two separate cars, a mixer car weighing approximately 18,000 pounds and a Pumpcrete car weighing approximately 16,000 pounds. Each car is on flanged wheels with individual traction drive to operate on 36-inch tracks. At the extreme right is one of the batch cars which will be used to charge the mixer. The batch body has a capacity of two 1¼-cubic yard batches. As the car is backed up to the mixer, two arms from the mixer car engage the body and hoist it into charging position, the body being lifted through a lever and cable arrangement which is part of the mixer car.

The mixer car carries the mixing drum which has the same diameter as the standard Rex 28-S drum but is lengthened to take a 1½-cubic yard mix. The discharge is directly into a transfer drum on the Pumpcrete car. This transfer drum is the most novel part of the entire unit. Closely spaced inside the bulge end of the transfer drum are buckets which carry the concrete from the mixer discharge up and on to a chute into the long cylindrical drum or the rotary remixer from which the concrete is discharged into a Rex 200 single Pumpcrete and pumped through an arch pipe into the forms. The machine is powered for dc operation, and all controls are conveniently placed to operate from a platform on the mixer car.

The two complete tunnel lining units will be operated independently of each other and each unit will be served by a fleet of fifteen batch cars. The contractor plans to dry-batch his aggregate and cement on the surface and drop the batch down a pipe through the shaft to a transfer bin and into the batch cars. The cars will be handled in the tunnel by locomotives and California type switches to keep the tunnel lining machines adequately supplied with material.



One of the Special Rex Tunneling Machines Used for Concreting on the Gunpowder Falls-Montebello Tunnel for Baltimore's Water Supply

DEMPSTER DUMPSTER Drop Bottom

DETACHABLE BUCKETS with

No Overhang
No Sidesway
No Counterweight

BOTTOM
PRECISION
CONTROLLED
DUMPING

LEADS THE WAY TO A NEW YEAR OF QUARRY AND CONSTRUCTION TRANSPORTATION

Zenner Bros. are among the Fleet Owners of New York City where more than 500 of these 2 cu. yd. Drop Bottom Buckets are in service daily.

Concho Sand & Gravel Co. of Oklahoma City recently installed 3 new "LF" (Load Forward) models with 15 of the 2 cu. yd. Drop Bottom Buckets.

U. S. Engineers, Conchas Dam, New Mexico, chose the Dempster-Dumpster 2 cu. yd. Drop Bottom Bucket. They have 20 Dempster-Dumpster Hoisting units on trucks handling these buckets on this project.

These successful operators know "what it takes" and every operator should investigate—because the new Model 200LF Dempster-Dumpster mounted on any 1½ ton truck and handling 2 cu. yd. Drop Bottom Buckets with all the load on the chassis will save 40% to 50% on any hand loading job.

Ask any user about the *DROP BOTTOM* Dumpster Bucket —then ask your Dealer or write us for details.

DEMPSTER BROTHERS, INC.
KNOXVILLE, TENNESSEE

WASHINGTON—BOSTON—NASHVILLE
CHICAGO—NEW YORK

Initial Soil-Cement Road Successful in Maryland

Soil Tests and Details of Construction on 2.65-Mile Project; Contract Awarded For Another Section

By NATHAN L. SMITH, Chief Engineer, Maryland State Roads Commission

(*Photo on page* 52)

✦ TO meet an ever-growing demand for a durable low-cost pavement for roads of low-traffic density, Maryland last summer started on soil-cement construction by building an experimental section on "the Eastern Shore" in Worcester County. We call this road "experimental" only because it is the first road of the type built by the state. Actually, the experimental aspect ended when we had determined that the soil was suitable for soil-cement construction. What followed was an orderly, scientific piece of road building. After months of use since its completion last July, that road has demonstrated that in soil-cement roads we have a type eminently satisfactory for light traffic.

The project is located on the Stockton-Little Mills road, beginning ¾ mile west of Stockton and extending south and west to an intersection with a north-and-south unimproved road near Little Mills, and is 2.65 miles long.

Soil Tests

Our first step was to run a soil profile on the whole project. This showed the soil to be uniform except for a swampy section 0.2 mile long, about a mile from the Stockton end. Here the contaminated surface soil was bladed to the shoulders and was replaced with soil similar to the fine sandy loam found on the rest of the project.

The next step was to find out how much cement should be used to obtain the desired hardness and durability. A typical sample of soil was used for the required tests which consisted of determining the moisture-density relations of soil-cement mixtures containing 6 per cent and 10 per cent cement by volume, molding specimens 4 inches in diameter and 4.6 inches high to maximum density and optimum moisture with cement contents of 8, 12 and 14 per cent by volume, and subjecting these specimens, after 7 days' cement hydration, to durability tests. These comprised alternate wetting and drying of one set of specimens and alternate freezing and thawing of a second set. Vigorous wire brushing removed all material loosened during the durability tests.

The tests, continued for 12 cycles, showed that a cement content of 10 per cent by volume in soil compacted to maximum density at optimum moisture content would produce a soil-cement road having low volume and moisture change characteristics and substantial hardness and durability. The optimum moisture was found to be 10 per cent and the corresponding density 122 pounds per cubic foot, oven-dry weight.

Field tests on soil samples also controlled the construction procedure. Two men, equipped with a portable laboratory, made frequent moisture-content determinations during the early part of the work, and each day before compaction started, to assure that compaction would be at maximum density and optimum moisture content. In tests made three times daily for 12 days, the final moisture content was found to range between 9 and 11 per cent and the density between 112 and 122 pounds per cubic foot, oven-dry weight. The density and the depth of each day's work was checked the following day.

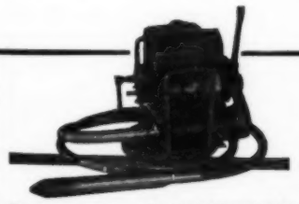
Construction Procedure

Each day's work was staked at 100-foot intervals, by 4-foot offset stakes for depth control, and 1-foot offsets as guides for the construction equipment. The existing road was scarified to a depth of 6 inches, and the soil was pulverized with a disc harrow and field cultivator, both tractor-drawn. Water was added as needed to soften clods and otherwise to aid in pulverizing.

Soil-cement processing was the next operation. Cement was placed transverse to the road in rows 3 feet 9 inches on centers. Three sacks were placed in each row, on the road centerline and 5 1/3 feet on each side. It was then spread evenly with hand rakes over the entire 16-foot road width. Cement thus spaced amounted to 80 sacks per 100 linear feet of 16-foot road, the equivalent of 0.45 bag per square yard. Total amount of cement used was 2,809 barrels.

Dry-Mixing Soil and Cement with a Harrow and Cultivator to a Depth of 6 Inches for a Stabilized Road

(*Continued on page* 42)



Concrete VIBRATORS
AND GRINDERS
Write for Circular on types, sizes and prices
White Mfg. Co.
ELKHART INDIANA

Speed-o-Matic
SHOVEL - DRAGLINE - CRANE

THE TOUGH JOBS
prove Speed-o-Matic's superiority!

The tough jobs are the real test and Speed-o-Matic has what it takes to make good even on the toughest. The short-throw hydraulic control levers which eliminate the slow, back-breaking hand-levers give Speed-o-Matic a flexibility and speed that result in greater production per hour at definitely reduced costs.

Driving Straight and Batter Piles with leads up to 105 ft. long!

● By converting a Link-Belt K-480 Speed-o-Matic crane with a 75 ft. boom into a pile driver, Nicholas Pile Co. handled piles from 80 ft. to 105 ft. long and drove them to refusal. In the words of Bob Ferris of the Nicholas organization, "We got this job because I assured the general contractor that we could drive batter piles 1 to 3 or a tow of 1 ft. in every 3 of height—and we did. No other crane on the job could do this without winding up in the soup!" That's the kind of performance Speed-o-Matics are ready to deliver for you — write for full details today!

The exclusive hydraulic control principle with its easy, short-throw levers makes the operation of a Speed-o-Matic as effortless as driving a car. Operator fatigue is banished and higher efficiency is maintained throughout the working period.

LINK-BELT COMPANY
300 West Pershing Road, Chicago Distributors and Offices in Principal Cities

LINK-BELT

Concrete Placing Methods Used on Coolidge Bridge

(*Continued from page 1*)

Footings

The excavation for the footings and for the foundation of the piers was done within steel sheet pile cofferdams driven from the trestle. The contractor used 32-pound DP1 Bethlehem steel sheet piling 65 feet in length on the coffers for Piers 3 and 4, 45-foot lengths for Pier 2 and 40-foot lengths of AP8 steel sheet piling for Pier 1. The piling was withdrawn at Pier 1 and remained in place in the other three. It was driven to refusal on those piers and then cut off at low water elevation with an acetylene cutting torch. As soon as the cofferdams had been driven, one at a time, they were unwatered with six 6-inch centrifugal pumps. After the sheeting had become silted up, one of the pumps was sufficient to keep the bottom dry by pumping from a low sump in one corner.

The cofferdam for Pier 1 measured 23 x 65.5 feet; for Pier 2, 30.5 x 73 feet; for Pier 3, 38 x 78 feet; and for Pier 4, 33 x 73 feet. The following description of the forms and the pouring of Pier 3 is typical of the methods used on all the piers except number 4 where a slight change in the handling of the concrete will be described separately.

On Pier 3 a set of H-beam wales was set 2 to 3 feet below water level and braced with 12 x 12 timber reinforced at the end of the dam with extra 12 x 12's bolted to the wale. The next set of wales was 8 feet below the first and consisted of a pair of 12 x 12 H-beams set 4 feet apart at the ends and trussed or crossed. The third set of wales was a pair of 12 x 12 timbers with 12 x 12 struts. All the wales were counterbraced with a double set of 12 x 12 timber. All excavation was handled ahead of the bracing so as to have as little interference with the bucket as possible. The excavation was handled by the Bucyrus-Erie steam crane from the offsets from the trestle at the piers. A special clamshell bucket designed by the contractor was used for the excavation. This 1½-yard bucket was shaped more like the orange-peel bucket, inasmuch as the sides were curved more than a clamshell to give a greater cutting effect for deep-water digging.

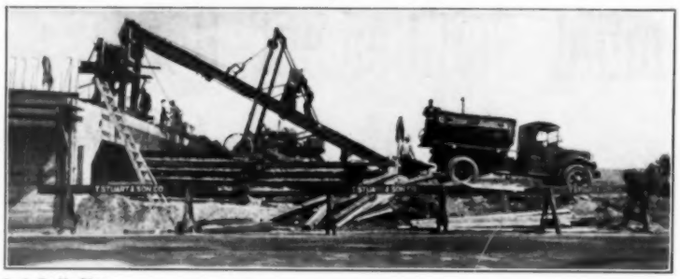
The foundation timber piles were driven with an iron pipe guide and a follower, thus doing away with leads on the pile driver. A 3½-ton No. 9B2 McKiernan-Terry steam pile hammer was used for the driving, and the piles used were up to 35 feet in length with an 8-inch tip and an 11-inch butt. The penetration of the piles was 16 feet which included 3 feet into the hard compact fine sand and small gravel which underlay the river silt. The piles project 2 feet into the seal which is 15 feet thick, combining the functions of a seal and footing in one continuous pour of 1,500 yards in 40 feet of water. The concrete was placed by 2-yard Stuebner underwater buckets swung by the steam crane and filled from the 2.5-yard hopper at the end of the Pumpcrete line which was extended along the trestle as required until it reached the end of the trestle at Pier 3. From there a different method of carrying the pipe line was used.

On each footing a secondary foundation was poured 8 feet high with sloping sides instead of with two steps as originally designed.

Forms and Piers

The forms for the secondary foundation consisted of ⅞-inch matched boards with 2 x 4 studs and 4 x 4 wales or "rangers" as the local carpenters refer to them. From the secondary foundation the pier proper was carried up in two 7-foot lifts to 4 feet below low water, using 3 x 8-foot panels of ⅝-inch plywood, with some 5 feet high, to take care of the various pours which varied from 5 to 17 feet in height. The sides on which these panels were used were battered ½ inch in 12 inches. The panels had 2 x 4's on the outer edges and a 4 x 4 down the center with 2 x 4 stiffeners.

After the first 14 feet of the pier proper, which brought it to 4 feet below low water, the nose consisted of pointed granite set in the concrete to form the ice breakers. The end forms consisted of ¼-inch Masonite around the granite and affixed to the side forms at the ends. These forms were built in the Watertown shops of the contractor and hauled to the job, a distance of about 85 miles. The batter on the nose was variable because of the conical section.



C. & E. M. Photo

Transferring Concrete from Agitator Truck to Buggies for Pouring an Abutment

All the concrete for the piers was placed with Stuebner 1-yard bottom-dump concrete buckets to eliminate the possible segregation of the concrete which may occur during chuting operations. All concrete placed in the structure was vibrated with an Ingersoll-Rand pneumatic vibrator. When placing the pier concrete, six men were used to handle the bucket and do the required extra hand puddling and some hand placing of the concrete. At the Pumpcrete hopper on the trestle there were three men on the hopper, two of whom handled the bucket and leveled off the concrete in the bucket while the other operated the hopper gate.

Batching and Mixing Plant

On the north side of the main highway

(*Continued on page 30*)

Join the "Charmed Circle" of Contractors who have PUSHED THEIR SCRAPERS TO THE LOWEST COST PER YARD

IN SANDY MATERIAL this 20-Yard Carryall was pusher loaded to earn extra profits for Louis Davis Construction Corp., Seaford, N. Y. 180,000 yards were excavated on this job to build a drainage basin for a North Bellmore (L. I.) parkway.

You've heard a lot about *pusher* loaded scrapers . . . we've talked it . . . others have talked it. Maybe you're one who helped pioneer the idea . . . 4 years ago . . . to get your 15% extra yardage each load in common earth . . . to cut loading time 33⅓% to 50%. If so, you have joined the "charmed circle" of contractors who today have an edge in the bidding . . . in the profits!

These contractors have gone still farther . . . by using *full drawbar horsepower* of both pusher and hauling tractor. Let's look at it this way: a tractor of 95 hp. will load to overflowing a 12-yard scraper. Add another tractor of equal rating (and you may as well, for fixed cost is about equal to smaller ones) and you have power going to waste.

It remained for R. G. LeTourneau to solve this: by building an extra capacity Scraper that matched perfectly one tractor's towing ability—and two tractors' horsepower for loading.

Make this comparison. A 12-yard scraper will get 9.8 pay yards pusher loaded with clay . . . a 20-yard LeTourneau Carryall will get 16.8 pay yards under the same conditions . . . with the same horsepower! On a one-way haul of 800 feet, the 12-yard will average 59 pay yards per 50 min. hour . . . while the 20-yard Carryall will deliver and place 84 pay yards per 50 min. hour . . . *at 18% lower net cost per yard*, including all ownership and operating expense.

Three major LeTourneau Carryall features make this amazing difference possible: (1) Hard-faced self-sharpening blades are set at plow-like angle to penetrate *naturally*, thus, cut power demand, (2) light weight with brute strength produced by patented box-beam, special alloy steel construction—"floated" on plenty of broad tread, large diameter tires, (3) plus a positive ejection tailgate that "wipes" each load clean. Thus, the next load slides and boils in without resistance, regardless of material, wet or dry.

Some day you'll try LeTourneau earth-moving tools. It is the only *complete* line on the market—backed by more than 3,000 successful Carryall* Scrapers from 3 to 30 yards, 'Dozers, Rooters*, Cranes, Buggies* and Power Control Units. Ask your "Caterpillar" and LeTourneau dealer for a demonstration! It will pay.

R. G. LeTOURNEAU, INC.
PEORIA, ILLINOIS STOCKTON, CALIFORNIA
Cable Address "BOBLETORNO"

PACKED CLAY heaped over the "spring pipe" each load for Contractors Healey Moore Co., and Frederickson & Watson Const. Co., of Oakland, Calif., on the 2,183,000-yd. highway excavation for the Santa Cruz Cutoff. 9 such 20-Yard Carryalls are being used to complete 6.3 miles of cut and fill.

LeTOURNEAU
CARRYALL SCRAPERS
Angledozers*, Buggies*, Bulldozers, Carryall* Scrapers, Cranes, Drag Scrapers, Power Control Units, Rooters*, Treedozers, Sheep's Foot Rollers.
*Name reg. U. S. Pat. Off.

New Heil Promotions

Announcement has been made of the election of Joseph F. Heil, a Vice President of The Heil Co., Milwaukee, Wis., since 1931, to the position of Executive Vice President and of George W. Kuhlman, Manager of the Heil eastern factory at Hillside, N. J., as a Vice President. Mr. Heil, the son of Julius P. Heil, President of the company and at present Governor of Wisconsin, has been associated with the company since his graduation from Northwestern University and is now handling the active management of the company while his father has the governorship of the state.

Mr. Kuhlman began his business career with The Heil Co. in 1919 and has served as manager of the Philadelphia and New York branch offices, Eastern District Manager and since the acquisition of the eastern factory in Hillside, as General Manager of that plant.

Winter Lining for Helmets

Good news for wearers of M. S. A. Skullgards is contained in a new bulletin just issued by the Mine Safety Appliances Co., Braddock, Thomas & Meade Sts., Pittsburgh, Penna. This bulletin, which announces the M. S. A. winter lining for Skullgards, pictures and describes this two-piece assembly of heavy close-woven material which consists of a standard-size skull cap and lined earmuff section which may quickly be inserted in the hat or cap without alteration or change of size. This winter lining is proof against wind, snow and rain, according to the manufacturer. Insertion or removal may be accomplished in a minute's time, due to the simple snap-fastener means of assembly.

Copy of this bulletin No. DK-7 may be secured direct from the manufacturer by mentioning this item.

Hanson Excavator Works Opens Chicago Office

Hanson Excavator Works, Division of The Hanson Clutch & Machinery Co., has opened a Chicago office at 224 South Michigan Blvd. where sales promotional and advertising activities will be handled in the future, instead of at Tiffin, Ohio. O. E. Quinton, who has been associated with dealer organizations in the distribution of construction equipment for the past ten years, has been appointed Director of Sales and will make his headquarters at the Chicago office.

Speed and Savings

from start to finish!

"Caterpillar" track-type Tractor, equipped with Willamette-Hyster winch, pulling a Sauerman dragline through gravel deposit in small stream—loading trucks. Handles 30 yards per hour on 2 gallons of fuel. Tractor's all-round ability makes it useful for many other time-and-tax-saving jobs for the road district it serves.

Two "Caterpillar" Diesel Auto Patrols—a No. 12 (front) for the heavy work and a No. 11 for the follow-up—on reconstruction-maintenance in Thurston County, Neb. This equipment handles the complete job, including bank sloping, at the rate of a mile every three days.

Saving time and tax dollars through the right equipment for the job . . . (*Above*) A "Caterpillar" Diesel Tractor pulling a sturdy "Caterpillar" Blade Grader. (*Below*) The same tractor, equipped with a LaPlant-Choate bulldozer for the heavier dirt moving, filling in and leveling. A bridge-approach job near The Dalles, Ore. An 8-hour day requires only 20 gallons of 7c fuel.

WITH DEPENDABLE AND ECONOMICAL "CATERPILLAR" DIESEL EQUIPMENT

Spring ahead . . . citizens clamoring for road repairs . . . taxpayers demanding that highway budgets show maximum results for their dollars! Winter's ravages leave many things to be done: Stabilizing and surfacing materials to be prepared—washouts to be filled—ditches cleaned—banks sloped—bridge approaches leveled—secondary roads graded.

There's nothing like "Caterpillar" Diesel-powered Road Machinery for such jobs. Start early—work anywhere—any time . . . for this equipment is made of sturdy stuff; laughs at weather; thrives on tough jobs. With tracks that ride safely over yet grip surely even in soft footing, "Caterpillar" Diesel Tractors push bulldozers, pull scrapers, scarifiers, graders, wagons. With winches, they yank out rocks and stumps; draw heavily loaded draglines across obstinate gravel beds. For heavy grading, finishing, bank cutting and sloping, they team up ideally with "Caterpillar" Graders.

For the every-day maintenance jobs—cleaning and pulling ditches, mixing, leveling, back sloping mile after mile of dirt or gravel road—"Caterpillar" Diesel Auto Patrols have the "handy-Andy" versatility to handle every kind of situation.

And—no matter what the work or which "Caterpillar" machine is called into action—speed, efficiency and rock-bottom operating costs are assured through "Caterpillar" *precision manufacture* and *complete and readily available parts-and-service facilities.*

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

CATERPILLAR

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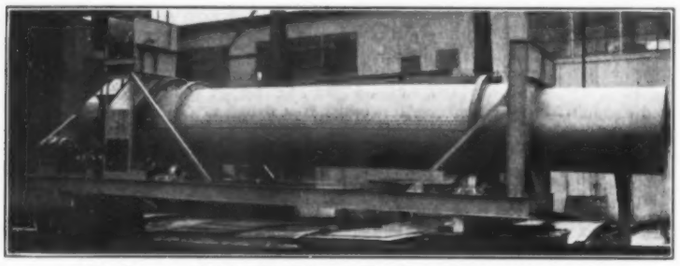
DIESEL ENGINES • TRACK-TYPE TRACTORS • ROAD MACHINERY



The Cummer Model SN15 Internal Fire Dryer for Hot-Mix Plants

New Internal Dryer For Asphalt Plants

An entirely new internal fire dryer, the first to be manufactured by the F. D. Cummer & Sons Co., Cleveland, Ohio, has just been announced by that company. This new type of dryer is built in six sizes, of 20 to 100 tons of dried material an hour, for use in hot-mix plants.

The dryer is a self-contained unit, with its own direct drive, built into one frame for easy loading on a trailer or flat car. Each unit has an extra large fan with individual motor drive and an adjustable air intake. The shell is of heavy durable construction, built with riveted buttstraps at the longitudinal seams. There are no transverse seams. The channels inside the drum are mounted so as to utilize the entire cross section for cascading materials. There are only one countershaft and three gears used on the entire unit. Roller bearings are used throughout. The large combustion chamber is fitted either with steam high-pressure or air low-pressure burners, or natural gas can be used.

New literature describing this new Cummer internal fire dryer for hot-mix plants may be secured direct from the manufacturer or from this magazine.

New 1939 Models Announced by Mack

One of the outstanding new developments announced by Mack Trucks, Inc., 34th St. & 48th Ave., Long Island City, N. Y., for 1939 is a Mack-Lanova diesel engine for use in Mack trucks. For the past eight years Mack has been observing developments in the diesel field, during which time hundreds of Mack trucks have been equipped with diesels. Now this company has become one of the first of American truck manufacturers to make its own diesel engines.

At present, the engine is available in only one size, of the 6-cylinder type with 4⅜ x 5¾-inch bore and stroke, developing 131 hp at 2,000 rpm. Bosch injection equipment is used and the starter operates on 12 volts. This new engine employs the Lanova energy-cell combustion system, features of which are smoothness, flexibility, low fuel consumption, and the single large nozzle jet of the self-cleaning pintle type to prevent clogging. The manufacturer states that the Lanova principle operates so effectively that peak pressures are little higher than occur in gasoline engines, and the more sustained combustion produces a high mean effective pressure. The cylinder block and crankcase are cast integrally, forming a compact unit braced by seven bulkheads supporting the main and camshaft bearings and extending well below the crankshaft level. Overhead valves on the longitudinal centerline of the engine are operated by drop-forged rocker arms and tubular ball-ended push rods from mushroom tappets. They are of 30-degree face exhaust valves seating in Mack Permafit inserts of Niferrite, copper-plates and faced with Stellite.

Rounding out its new light-capacity line, Mack has brought out a new model with a gross vehicle weight rating of 8,500 pounds, with standard 6.00-17 tires on the front and single rear. According to the manufacturer, this Model ED is a small-scale heavy-duty truck. Offered in a standard wheelbase length of 120½ inches, this model accommodates 8-foot body lengths. Power is furnished by a 6-cylinder engine with 3⅛ x 4⅜-inch bore and stroke, developing 67 hp at 2,800 rpm.

A New Sheet Metal For Highway Signs

A new kind of galvanized sheet metal with a special phosphate coating bonded with the zinc, which is claimed to give longer life and greater economy in highway signs, has recently been announced by the American Rolling Mill Co., Middletown, Ohio. The advantages of this new sheet metal are said to be greater paint adherence, lower initial cost and greater resistance to sharp blows of flying stones or the practice shots of traveling sportsmen.

Further information on these Armco Paintgrip sheets may be secured by interested highway engineers direct from the manufacturer.

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EQUIPMENT

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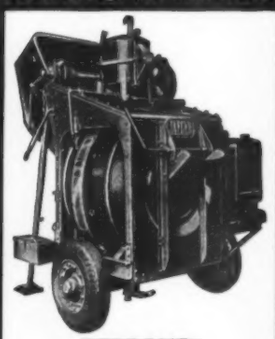

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Send for New Catalog, Prices 3½S to 56S Sizes.

THE JAEGER MACHINE CO.
701 Dublin Ave., Columbus, Ohio

JAEGER

North Carolina Road Widened and Surfaced

(*Continued from page 2*)

New Jersey asphalt tank cars, the limestone dust and the coal for the operation of the plant were delivered. The sand was delivered by truck under a subcontract by F. G. Templeton of Charlotte, N. C., who opened a pit about 3 miles from the plant and loaded a fleet of ten trucks with his new Osgood ⅜-yard shovel. These trucks delivered the sand to the stockpile at the plant from which it was rehandled by Blythe's Northwest crane with a 35-foot boom and a Williams 1-yard clamshell. The sand was placed behind a barricade with a metal belt feeder below which moved the material forward to the cold material elevator. The rate of flow was controlled by a man at the feeder who also pulled out roots from the material. A Brown temperature indicator, well protected against damage by a wood covering, showed the man at the feeder the temperature in the hot sand elevator. This was maintained at from 300 to 350 degrees F.

Limestone dust for the surface batches was taken direct from the cars in wheelbarrows and dumped into the end of a screw conveyor which delivered it to a separate bucket elevator and thence to a separate bin. A dust house was maintained but the contractor preferred to deliver direct from the cars to the conveyor as the cost of handling the dust was doubled if it was stored.

The sand was delivered to the drier of the Simplicity System plant and then to the hot elevator and to the screens which sized the material for the sand and stone bins. Stone of ¾-inch and smaller was used in a special mix for building up superelevated curves on the old road which had none. The aggregate gave the material a greater stability to withstand the higher pressure of vehicles traveling at high speeds around the curves. This mix was also used whenever the base course required was greater than 3½ inches in thickness.

The asphalt was heated in the cars by the steam from the same boiler which provided power for the operation of the plant and also heated the storage tanks. The asphalt was pumped from the cars to the 36,000-gallon storage tanks or it could be pumped direct to the loop at the weigh box and the excess permitted to run to the storage tank. This tank was set on the ground on a foundation of bituminous concrete. The heat from the boiler fire was used in the drier of the plant, thus effecting as complete usage of the heat of the coal burned as possible.

C. & E. M. Photo

The Busy Screws Spread the Uniform Top on Yesterday's Binder

The plant personnel included a Plant Foreman, one asphalt weigh man who attended the mixer and dumped the batches, one aggregate weigh man, one coal fireman on the drier and boiler, and one feeder man. When running top, two additional men were required for the dust.

The following batch weights were used for the various batches for the leveling course, the top and the special mix for the superelevated curves:

Material	Courses Leveling	Surface	Super-elevation
Sand	1,880	2,162.5	600
Stone	...	...	1,300
Dust	...	125.0	...
Asphalt	120	212.5	100
Pounds per batch	2,000	2,500.0	2,000

The hauling of the batches to the road was subbed to L. L. Pullen of Rocky Mount, N.C., who used a fleet of five to ten trucks hauling 5-ton loads. The plant production for the widening strips averaged 45 to 50 tons per hour or 600 tons per 12-hour day. On the leveling course the production was 40 to 45 tons per hour and on the top the whole outfit really went to town with a top production of 665 tons in 11¾ hours for the best day. The average production of top was 50 to 55 tons per hour. The mixing time specified was 45 seconds for the leveling-course and 60 seconds for the surface-course mixes.

Laying Base and Surface

The old pavement was squeegeed with 85 to 100-penetration asphalt applied with the contractor's own Littleford Junior distributor remounted on a truck chassis. This 1/16-gallon per square yard provided a tack coat for the leveling course and another of 1/12-gallon was applied ahead of the surface course. The leveling course ran from a minimum of ½ inch thick to an average of 1

(*Concluded on page 33*)

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"For use where power is not practical or available"

Manufactured in 2, 5 and 15-Ton Sizes. For capacity comparison, ½" cable used:

2-Ton "Lightweight" ..... 75 ft.
5-Ton "General Utility" ..... 250 ft.
15-Ton Triple-Geared "Special" ..... 1200 ft.

Patent instant gear change and positive internal brake that never fails, and will lock load. Price, f.o.b.

Gear Ratios	Weight	Seattle
2-Ton 4, & 22 to 1	60 lb.	$ 50
5-Ton 4, & 22 to 1	110 lb.	$ 75
15-Ton 4, 19 & 109 to 1	680 lb.	$250

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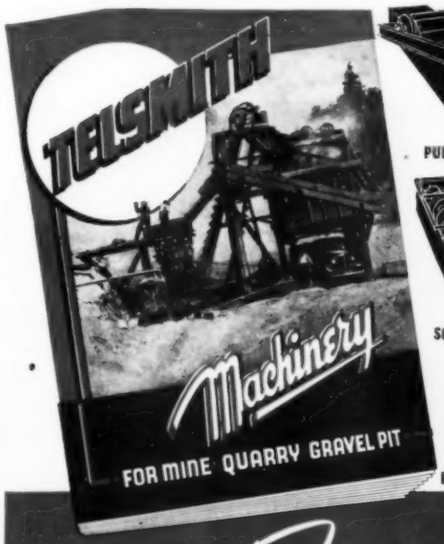

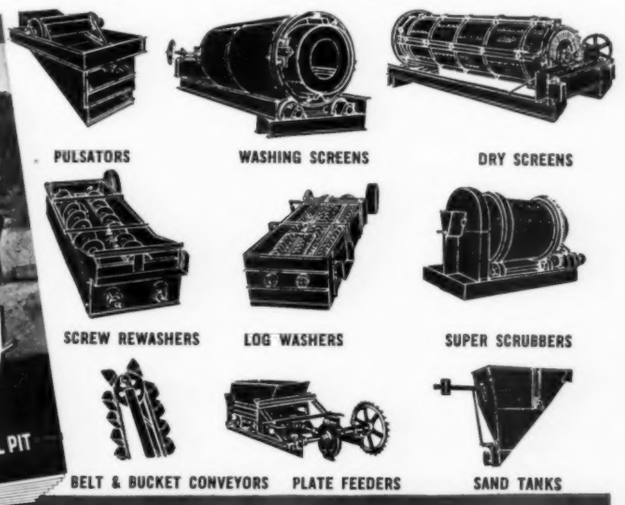

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Only Telsmith's long and varied experience . . . Telsmith's close contact with plant operators and operating conditions all over the world . . . could produce a line of equipment, crushers to bin gates, *so modern and so complete!*

But even more valuable to you is Telsmith Engineering Service. Telsmith plans your entire plant . . . stationary, semi-portable or portable . . . exactly to suit *your* needs—selects the right machinery . . . synchronizes its operation. Telsmith centralized responsibility produces results! *Get the New Telsmith General Bulletin, E-34.*

EC-1-39

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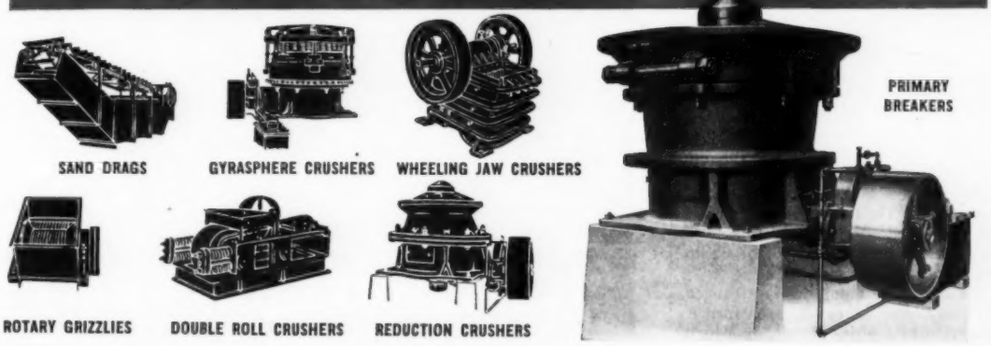
51 Sleeper Street, Cambridge, Mass.
Bendelari & S. Co., Louisville, Ky.

TELSMITH



The New Marion Type 331 Excavator

Some Improvements In 3/4-Yard Excavator

A number of improvements in the Marion Type 331 ¾-yard excavator, known as the "big little machine," has been announced by the Marion Steam Shovel Co., Marion, Ohio. The twelve features incorporated into the construction of this excavator are designed to provide the stamina and power of a large excavator without sacrificing speed or mobility.

These features include tubular all-welded steel boom, anti-friction bearings at each important point, cone-type rotating clutches controlled by a single lever, chain crowd for positive control and easy boom adjustment, bevel gears enclosed in oil, guarded boom points, and positive locks on the swing shaft to prevent the upper frame from rotating while propelling. Maximum operating speed is secured by properly balanced machinery units, conveniently arranged operating levers, and wide range vision for the operator. The self-cleaning crawlers are claimed not to clog in any type of material nor bind when moving over uneven surfaces, the tapered open pockets in the driving sprockets providing a dirt-shedding action which prevents delay due to clogged crawlers. The crawler belts are of manganese steel and are of sufficient width to distribute the weight so that the Marion Type 331 can work in soft materials as well as on hard earth or stone.

The Type 331 is especially built for highway construction, sand and gravel pits and similar operations where a substantial machine of less than 1-yard capacity is needed. It is readily converted from a shovel to a crane, pull shovel, clamshell, or dragline.

New Sodium Luminaire For Tunnel Lighting

An enclosed-type sodium luminaire especially adaptable for use in tunnels where head room permits suspension from the ceiling or, in a modified style, where recessing into the tunnel wall or ceiling is desired, has been announced by the General Electric Co., Schenectady, N. Y. Already installed in the McCallie Avenue Tunnel in Chattanooga, Tenn., and in the Stockton Street Tunnel in San Francisco, this type of luminaire will soon be in operation in the Liberty Tunnel in Pittsburgh.

Alzak aluminum reflecting surfaces in the luminaire hood provide a high utilization of the sodium light output over the tunnel pavement. An enclosing glass bottom door protects the reflecting surfaces from dust and material in the tunnel air. The sodium lamp, mounted horizontally in the unit, is shielded from direct vision by the hood of the luminaire. A pivot mounting for the luminaire is available when complete shielding of the lamp is desired in one-way tunnels. The luminaire is equipped with a standard cathode preheating automatic resetting timer and with a radio interference suppressor.

The luminaire mounting is arranged for both multiple or IL transformer connection to a series circuit, or a high 10,000-lumen a-c sodium lamp, in conjunction with a two-wall 70-G vacuum flask, is recommended for use in the enclosed-type luminaire.

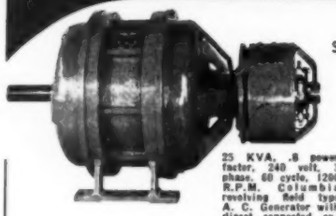
Hercules Diesels For Ford Trucks

Without any major changes in the chassis, frame or dash assembly, all models of 1935-1939 Ford V-8 trucks may now be equipped with a standard Hercules diesel engine of identical mounting dimensions, according to a recent announcement from the Hercules Motors Corp., Canton, Ohio.

The Hercules diesel engine is arranged with a special flywheel housing to fit the Ford transmission and has a special type of front gear cover with supporting arms which duplicate the Ford V-8 front engine mounting. After the complete Ford engine unit has been removed from the chassis, the Ford transmission and clutch assembly are attached to the diesel flywheel housing. After the necessary wiring, control unit and similar installations have been made, the diesel engine with transmission and clutch assembly can be placed in the chassis with very little more effort than is required to install a standard Ford V-8 engine, according to the manufacturer. This Hercules replacement engine is the Model DOOC four-cylinder 4 x 4½-inch bore and stroke heavy-duty 70-hp unit.

Further details on this diesel engine and its use in Ford trucks are contained in Bulletin No. SP-155, copies of which may be secured direct from Hercules.

COLUMBIA A. C. GENERATORS



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SIZES: 1 TO 156 KVA.
SPEEDS: 1800, 1200, 900, 720, 600, 450 R.P.M.
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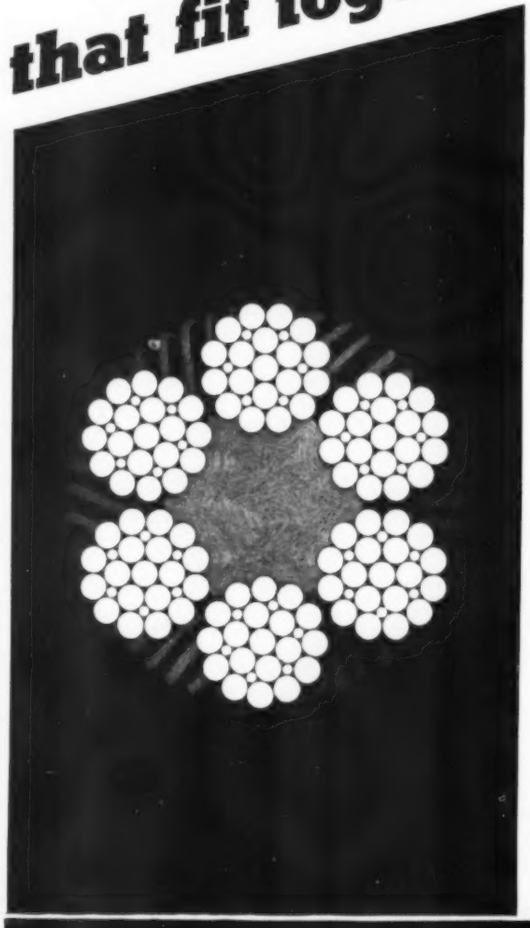
BETHLEHEM Specify FORM-SET PRE-FORMED ROPE

150 moving parts that fit together perfectly



HERE are the moving parts of a heavy-duty machine—a Purple-Strand Form-Set Hoist Rope, 6 x 25 construction. There are 150 of these parts, and they must fit together perfectly within a cross-section exactly three-fourths of an inch in diameter.

To design a rope of this type involved considerably more than merely fitting the required number of wires into a small space. Each outside wire must be solidly supported to avoid crushing on the drum. Each strand must be a tight yet flexible unit to withstand pressure and bending as it moves over sheaves. The center must be of the right density and size to enable each strand to function properly as a part of the rope. And each of these factors must be tempered by a knowledge of probable drum and sheave sizes, operating loads, and running speeds.

Bethlehem Purple-Strand-quality ropes are precision machines. Designs of various Purple-Strand lines have been worked out to the most minute detail. The quality of the steel is the finest our metallurgical and melting organizations can produce. Wire drawing is in the hands of wire-mill craftsmen who specialize in rope wire. Machines making Purple-Strand are operated by men of the highest skill. From the top-quality steel to the final testing and inspection, nothing is overlooked to make Purple-Strand Form-Set Hoist Rope the finest money can buy.

BETHLEHEM STEEL COMPANY

C. & E. M. Photo
Welded Tie Bars on a Bridge Pile

Tie Bars Are Welded To Pile Reinforcing

By CECIL JOHNSON, Resident Engineer, South Carolina State Highway Department

✦ A NOVEL method of conserving reinforcing steel and saving time was used by R. H. H. Blackwell, contractor of Jacksonville, Fla., on the approach piers of the Battery Creek Bridge near Port Royal, S. C. These piers are of precast concrete pile construction with concrete caps. The plans required a 4-foot additional length for six of the eight 1-inch bars running the length of the 18-inch square piles. The specifications called for a 40 diameter lap fastened with two cable clamps for the spliced bars and also provided that the length of the piling be determined by the contractor.

In order to drive the piles with 4 feet of reinforcing protruding from the pile it would have been necessary to have a special follower block made. As tests had shown that the rock to which the piles were to be driven varied as much as 10 feet in elevation in a distance of a few feet, it was apparent that much extension of steel would be necessary.

Blackwell left the rods protruding from the piles a distance of 8 inches and poured with the pile 9 inches of additional concrete 16 x 16 inches around these rods to permit driving without a special follower block. After the piles were driven, the 9 inches of concrete was cut away and extensions were welded on. The State permitted the 8-inch weld after a number of them had been tested and approved by the Highway Department's Testing Laboratory. Under test the welded rods in each case broke before the weld showed any signs of failure. All of the welds were made with the contractor's General Electric 300-ampere welding unit powered with a Ford V-8 engine.

This work was done on Federal-Aid Project 437, Contract 1, for the construction of a 987.44-foot combination and swing span bridge over Battery Creek on the Beaufort-Parris Island road, the contract for which was awarded to R. H. H. Blackwell, Jacksonville, Fla., on his low bid of $90,426.29. J. R. Cruise was Superintendent for the contractor and the author was Resident Engineer for the State. W. J. Gooding, Jr., is Bridge Engineer for the South Carolina State Highway Department.

Heavy-Duty Equipment To Work with Pavers

Push planers, trailgraders, and concrete strike-offs are very important tools around a concrete paver, to insure accurate subgrades and the proper placing of concrete reinforcement in the slab. The Cleveland Formgrader Co., 6723 Denison Ave., Cleveland, Ohio, builds the sturdy Cleveland Push Planer which has sufficient weight to insure accuracy in the final grade and is heavy enough to be used as a subgrader. Mounted on four single-flanged wheels, with the cutting blade arranged diagonally to pass the earth in windrows on each side of the paver, and with its cutting blade adjustable for crown changes, this Push Planer weighs 4,500 pounds for the 20 to 22-foot machine.

The heavy-duty trailgrader weighs 3,500 pounds and carries dished-type blades. Cleveland trailgraders are built with 2 foot adjustment as standard and sizes range from 9 feet to 30 feet. Adjustable drawbars are provided for a rigid connection to the paver and transportation wheels mounted on a crank axle are standard equipment. Vertical adjustment is provided at each side truck, so that proper clearance for the mixer bucket over the trailgrader can be obtained regardless of the height of the side form. This is important to contractors doing work in various states under different specifications.

Accurate strike-off of the concrete for placing reinforcing mesh is important. The Cleveland concrete strike-off has a vertical adjustment on each side truck, permitting quick variation of the depth of strike-off below the form. Eccentric axles on the end truck give a 3-inch lift to pass the strike-off over expansion joints. The crossbeam to which the strike-off plates are fastened is made of a heavy H-column stiffened by two channels. The blades are made in sections and are fastened to the crossbeam through slotted holes, which allow for adjustment to the crown of the concrete. An extra notched blade is furnished for use at the center, where center steel is specified. The strike-off is pulled ahead by cable from a special winding drum on the paver.

Diesel Engines Tested On Construction Jobs

An interesting piece of promotional literature has been issued by the Cummins Engine Co., Columbus, Ind., devoted to the use of Cummins diesel engines in the dump truck and contracting fields. This 20-page illustrated pamphlet, "Job-Test Evidence," is devoted entirely to pictures and stories on contractors and dump-truck operators who have placed repeat orders for Cummins diesel engines in new equipment and have ordered these engines to replace gas power fleets of 10, 20, 50 or more trucks. Work from coast to coast and from northern Minnesota to the Andes Mountains of South America is covered in this interesting booklet, which may be secured by writing direct to the manufacturer and mentioning this item.

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ANNOUNCING A NEW AND FINER MODEL F CLETRAC

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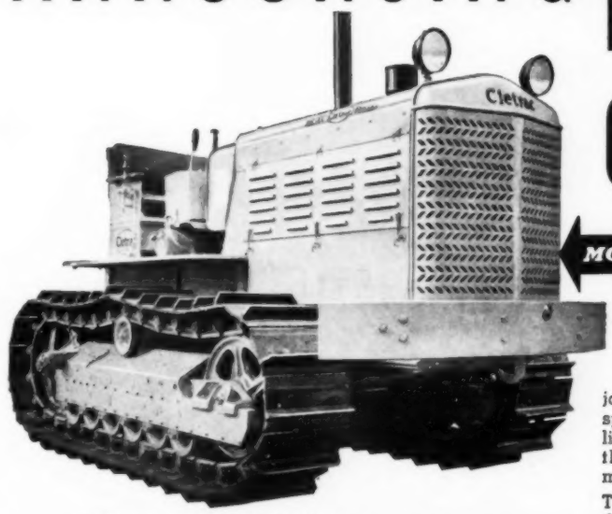


CLETRAC MODEL F DIESEL 95 drawbar horsepower; 107.5 belt horsepower; also available with gasoline engine—94 drawbar horsepower; 110.93 belt horsepower

TWO YEARS and three months ago, Cletrac engineers began developing a bigger and better Model F Cletrac. Cletrac Model F had always done a good job—but users asked for more power, more speed; heavier, sturdier construction—streamlined design . . . a dozen new things in a tractor that would meet the ever-increasing demands of industry for heavy-duty work.

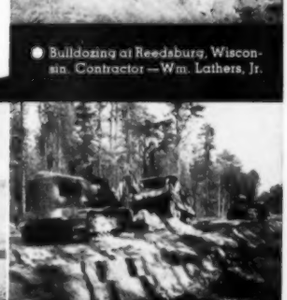
The new Cletrac Model F is an answer to these demands. Here is a tractor that has the capacity to handle the largest scrapers and wagons on construction jobs . . . maximum footage in lumbering . . . the heaviest trailbuilders, bulldozers and graders on road building work.

With four forward speeds, two reverse, and a high of five miles per hour, this new Model F reduces time on every trip . . . gives greater performance each day with larger production and lower costs.

Cletrac Model F performs jobs like this

● Bulldozing at Reedsburg, Wisconsin. Contractor—Wm. Lathers, Jr.

● Operating a 20-yard scraper at Marten, Neb. Contractor—Morrison-Knudsen Co., Inc.



● As operated by the U. S. Bureau of Roads at Beltsville, Md.

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In announcing this new Cletrac Model F, we are able to bring you outstanding performance records because this tractor has been on the job and *proved in service for many months.* This is the first time a new, powerful tractor has been announced only after use and acceptance by many of the largest contractors in the country. These "on the job" tests have proved Cletrac Model F:

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Go over this Cletrac F with a fine tooth comb. Compare it feature by feature. Ask your Cletrac distributor to demonstrate it on your own jobs. You'll prove to yourself that Cletrac Model F will give you the performance, the capacity, the dependability that means lower costs, more profitable operations.

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Cletrac Crawler Tractors
Built to Endure

Southold Is One of Six Towns on Long Island Which Recently Purchased South Bend Bituminous Distributors

Six New Distributors Bought by L. I. Towns

Six towns on Long Island, N. Y., have recently purchased the latest models of South Bend bituminous distributors for use in their road construction and maintenance. This type of distributor, which is available in tank capacities of 500 to 2,100 gallons, has an elliptical electrically welded tank, two high-pressure generating type burners shielded from drafts, a 40-gallon fuel tank, a Viking self-draining rotary pump, a 24-foot long spray bar in sections or shifting spray bar and is powered by a Hercules 4-cylinder engine.

Complete details on this South Bend distributor are contained in a well-illustrated folder, copies of which may be secured by interested contractors, state, county and township engineers direct from the Muncipal Supply Co., South Bend, Ind., or from this magazine.

Uses of Overdrive In Truck Operation

There are three general types of overdrive: the passenger car types, the truck transmission types, and the auxiliary transmission type. The overdrive in cars and in truck transmission are characteristically alike in that their principal use is connected with speed. They are one gear, of higher ratio than high or direct and their purpose is to cut down engine revolutions while the vehicle maintains a high road speed. Being of a higher ratio than direct gear, they have less pulling power than direct.

The third type of overdrive, produced by the overdrive gears in an auxiliary transmission mounted behind the truck transmission, has an entirely different mechanical action. Instead of being only one gear, it is in effect four different gears, transmitting a higher ratio, or overdrive, to each of the four forward truck transmission gears. The first three, overdrive first, second and third, are all of lower ratio than direct or high, and hence rank better in pulling power than high gear. Their principal value lies in the fact that they split the spaces between the regular first and second, second and third, and third and high gears in the truck transmission. To put this into figures, let us take the speed of a typical truck. In high, its normal highway speed is 46 miles an hour but in third it is only 27 miles an hour. With an auxiliary transmission it would have a halfway-between speed of 35 miles an hour. Thus, it gains 8 miles an hour by using this type of overdrive. The fourth overdrive gear, overdrive high, has the same characteristics as the passenger car and truck transmission overdrive. It reduces engine speed while it maintains road speed or it maintains engine speed while it increases road speed.

The Watson-Brown-Lipe auxiliary transmission, made by the H. S. Watson Co., 1145 Harrison St., San Francisco, Calif., provides this type of overdrive. It is installed in the drive line, behind the regular transmission, and its control lever is mounted in the cab. It amplifies and compounds the regular transmission gears, providing two additional gears between first and second, two between second and third, and two between third and high, making it possible to gear the truck for any load or speed, and lessening the shock and strain on the engine, clutch, drive line, universals and rear axle. Engine overspeeding, lugging, bucking and frogging are eliminated. With the right gear ratio the engine can be operated in its proper speed range, saving fuel and oil. In overdrive high, the engine speed is reduced about 700 revolutions per minute, 1,000 per mile, or 40,000 per hour, which results in a cooler engine and saves about 20 per cent of fuel and also saves oil, according to the manufacturer.

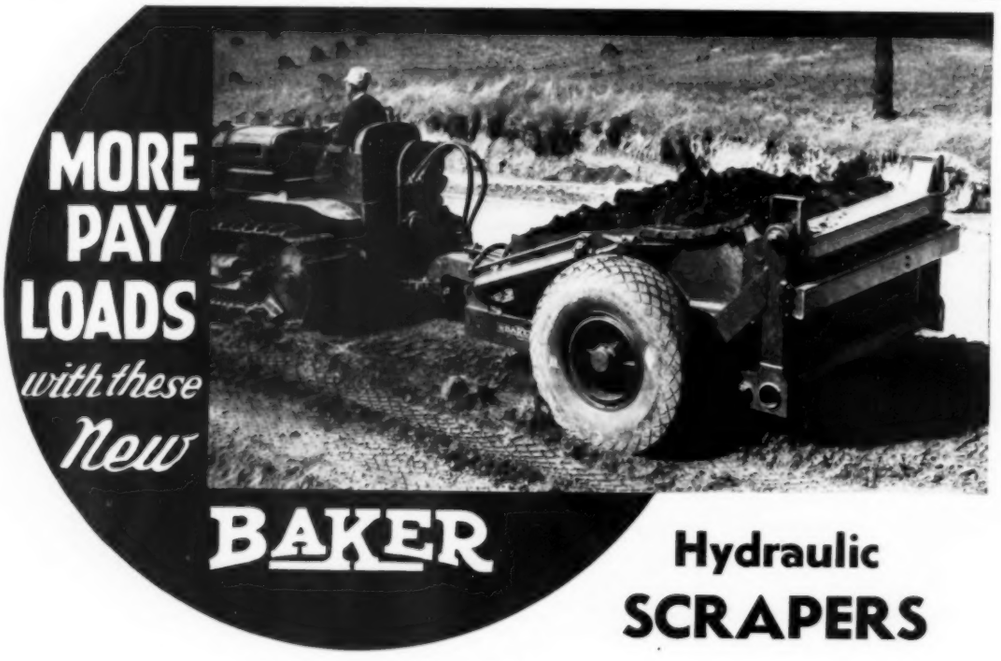
Most auxiliaries for motor trucks have not only an overdrive, but also an underdrive. The underdrive is for starting heavy loads under poor road conditions such as getting out of borrow pits. This underdrive relieves the shocks and strains on all parts of the truck, saving rear axle and drive shafts. The combination of underdrive with overdrive gives a motor truck a flexibility of operation that can be secured in no other way.

Literature discussing the principle of auxiliary transmission and describing the Watson-Brown-Lipe auxiliary transmissions which are available for all makes of motor trucks may be secured by those interested direct from the manufacturer or from this magazine.

Calcium Sulphite Used As Dust Layer Abroad

Sulphite of lye or calcium sulphite is being used as a dust layer on roads in Finland. The principal constituent of the mixture used is the calcium salt of lignosulfonic acid which is obtained as a very diluted solution in the manufacture of sulphite pulp. The use of this dilute liquor has in most cases been uneconomical due to the large amount of water in it. On the other hand, the concentration of the liquor has to the present been an unsolved problem both technically and economically. Manufacturers in Finland report that after one year of experiment they have been able to produce a concentrate with 50 per cent solids and also a dry material in powder form.

The Finnish Administration of Highways and Waterways will, it is reported, continue its dust laying experiments with this material on a larger scale in 1939, as evidently results to date, though not final, justify further trial.



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The flat digging angle remains practically constant, regardless of the depth of the cut, keeping smooth, even grades. When the pan is raised, the rear of the scraper automatically rises to afford ample clearance for hauling, dumping and spreading. The Scraper dumps cleanly and spreads evenly.

An efficient hydraulic system, the result of twenty years' experience, insures perfect control. Alloy-steel construction combines light weight and great strength. Available in sizes for use with 20-horsepower tractors up.

Baker Bulldozers

Baker Bulldozers handled the bulk of the earth moving jobs at the New York World's Fair site. Their sturdy, simple construction, twin-cylinder, direct lift operation and accurate control make them the choice of contractors for important jobs everywhere.

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Road-Mix Program In Harrison County

Careful Sieve Analyses of All Aggregates Insures a Dense Surface, Best Laid On Well-Prepared Base

(*Photo on page 1*)

✦ ON VISITING Harrison County, Miss., interviewing the County Engineer, Robert Gernon, in his office in Gulfport, and later visiting some work in District 2 and discussing the county construction program with Mr. Gernon and Oscar O'Neal, Supervisor for District 2, we were pleased to find the fundamentals of good road construction being applied to the completion of a 4.5-mile secondary road connecting U.S. 49, a main north and south artery, with U.S. 90, one of the well-known east and west thoroughfares of the nation.

"I believe that our practice of building an adequate base that is solid, well-drained and well-shaped before we attempt any surfacing insures the people of District 2 a greater mileage of more lasting roads at a lower cost of construction and maintenance over a period of years than using a higher type of surface that rides no better, and placing it on an inadequate base," said Mr. O'Neal, who is fitted for his work through a background of experience with the county highway department and who shows his complete interest by watching the work and studying costs and results with the County Engineer as the work progresses.

This Supervisor is correct. The motto of any county highway official should be "Build Better Bases to Insure Longer Lasting Surfaces." To be sure not every surface stands up under the punishment of the increasingly heavy loads of commercial trucks, and the same proportions of binder and aggregates do not hold for every county, or even for every part of the same county, but a careful analysis of aggregates and some experimenting will show the most stable mix and the least expensive. By "least expensive" we always mean the combined costs of construction and maintenance over the life of the improvement.

Preparation of the Base

The 4.5-mile road under construction as a WPA project consisted of an old 24-foot gravel road which had received no bituminous treatment and had shoulders and slopes 16 feet wide. The project aimed to provide an 18-foot road-mix paving of the prepared base.

The base was scarified to a depth of 4 inches for the full 24-foot width, with from 10 to 15 per cent of clay added as required to stabilize the base material. This was thoroughly wet with water from a tank wagon, bladed and rebladed with a pulled grader while traffic used the road. This traffic is very heavy with mostly 7-ton loads of long piles and poles being hauled to a creosoting plant located on the road. The base was left for 6 months to compact under traffic and then the loose material was bladed off to leave a uniform crown for the 18-foot width of the surface course.

The prepared base was primed with 0.3 gallon of RC1 per square yard at a cost of 8.18 cents per gallon applied by the asphalt contractor, using his own Etnyre distributor. Traffic was allowed onto the road after three hours, this time being necessary to insure against picking up of the prime material by the tires of the vehicles. The prime was then allowed to cure thoroughly for one week under traffic. The curing period was extended if weather conditions retarded curing.

Road-Mixing Methods

In preparation for the work, the county ordered all aggregates stockpiled within one mile of the points where they were to be used. This method prevented delays after the work actually started when river shipments might be delayed and also gave the materials, all produced by river dredging, an opportunity to dry out to a low moisture content. All mineral aggregate was carefully graded by sieve analyses to eliminate guesswork and to insure that the final mix would be as dense as the character of the local material made possible.

The washed gravel was hauled in from the stockpile nearest to the section being worked and spread from the tailgates of the trucks for a predetermined distance per truckload as indicated by pins set straight ahead by the county inspector. The distance was measured to give a layer of gravel 1 inch to ¼ inch in size just 1 inch thick. Following this the ¼-inch to 10-mesh pea gravel was spread in a similar manner for a depth of ½ inch. On this the sand, all passing a 10-mesh sieve and with 40 per cent passing an 80-mesh sieve, was spread in the same way. The aggregate was designed to give 55 per cent smaller than ¼ inch.

C. & E. M. Photo

The Bituminous Contractor Shooting 0.3 Gallon of RC-2 Per Square Yard on a Harrison County Road Before Mixing

These three layers of mineral aggregate were then mixed by blading with a 12-foot Adams hydraulic control patrol, care being taken not to cut the primed base. This machine is heavier than is required for this work but was available and was used throughout the

(*Concluded on page 26*)

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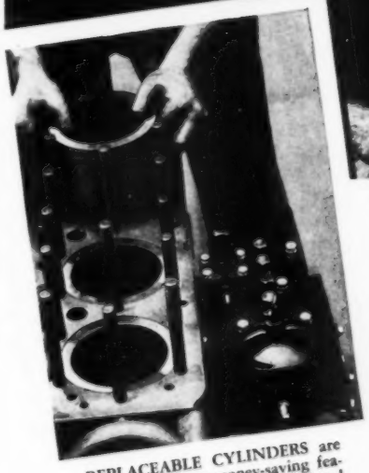

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INTERNATIONAL HARVESTER COMPANY
(INCORPORATED)
180 North Michigan Avenue Chicago, Illinois

INTERNATIONAL Industrial Power

Distinctive Lights For Snow-Plow Units

(*Continued from page 5*)

back of the truck. Occasionally the drivers use a kerosene torch or flare as an additional safety measure.

W. H. Root, Maintenance Engineer of the Iowa State Highway Commission, writes that the special lights used on their snow plows to identify them have proved effective, even during the worst storms. In addition to the standard lights required by law, a special cluster of five lights is mounted in an inverted V on the top of the truck cab. These lights, which show amber from the front and red from the rear, are on a separate circuit. The mounting is so arranged that they can lay down flat on the top of the cab when the truck is being used for ordinary work.

In Kansas, all snow plow equipment has the headlights placed on brackets on the upper forward corners of the truck cab. In addition, three red lights are placed in the center of the cab and red flags placed on a conspicuous point at the rear of the cab. L. L. Marsh, Engineer of Maintenance, reports that with this lighting and marking system, there has been very little difficulty from traffic accidents.

Massachusetts Experiments

Realizing the need of properly lighted snow removal units, Massachusetts has equipped its units with a special 12-16-volt electrical system with an 800-watt generator having a magneto and auxiliary battery system, and is constantly experimenting with new and different warning lights, it being possible to use still more lights with the present electrical system. At the present time, all units have, in addition to two headlights and two tail stop lights, two sets of cluster lights, one in the front and one in the rear. These lights are of the beehive type, consisting of two amber lights with a blue light in the center. This color scheme has been adopted by the Department and is now generally recognized as such. Clearance lights are on an arm which can be folded out of the way when not in use. A large red warning light on a telescopic arm, which allows it to be raised considerably above the top of the truck, and equipped with a standard red traffic light, has proved of particular advantage when sanding is being carried on, especially on a hill, as the height of this light affords a warning over the brow of the hill. Two adjustable spotlights installed on the top of the cab serve to illuminate the plow and wing and furnish added visibility for the driver during plowing operations and also serve to illuminate the rear of the truck when sanding. As an additional safety measure to afford reasonably good visibility, as well as comfort, the cabs are equipped with adequate heaters, two sleet eaters and a ventilating fan.

J. E. Lawrence, Maintenance Engineer of the Massachusetts Department of Public Works, reports that the Department has also been experimenting, with satisfactory results, in the use of reflector button warning signs attached to the rear of the trucks. These signs, made up in the same manner as traffic direction signs, usually read "Snow Truck" and have been found very effective. It is intended to equip every state truck with signs of this sort as soon as possible.

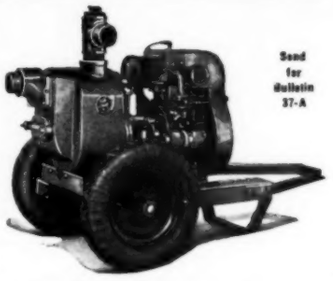
Montana's System

In Montana, the headlights are elevated to a position over the cab of the truck so that they will not be obstructed by the snow plow, and also so that they will not be interfered with by flying snow. Between these headlights are three green lights to outline the top of the vehicle. An extension arm, consisting of ¾-inch pipe members which telescope into a larger pipe attached to either the back or the top front of the cab, carries double lights upon each side (green from the front and red from the rear) which extend out to the full width of the plow, serving as clearance lights to outline the full width of roadway occupied by the snow plowing unit. The rear of the truck is marked by the regulation red tail-light on the left corner of the truck frame, an auxiliary red tail-light on the lower left corner of the motor house or dump body, and by three red lights (in the case of trucks carrying a motor house) placed in a row at the top center of the motor house. Further protection is afforded through four red reflectors placed at the corners of the motor house or dump body. A headlight is also placed at the upper left rear corner of the motor house or cab to throw its rays to the rear when visibility is extremely poor. According to Scott P. Hart, Maintenance Engineer, this system of lighting has proved entirely adequate even during the most difficult operating conditions.

Effect on Driver's Perspective

W. S. Holesworth, Equipment Superintendent for the Nevada Department of Highways, brings up an interesting and important point in connection with the placing of headlights on truck cabs to bring them above the plows. On Ne-

(*Continued on next page*)



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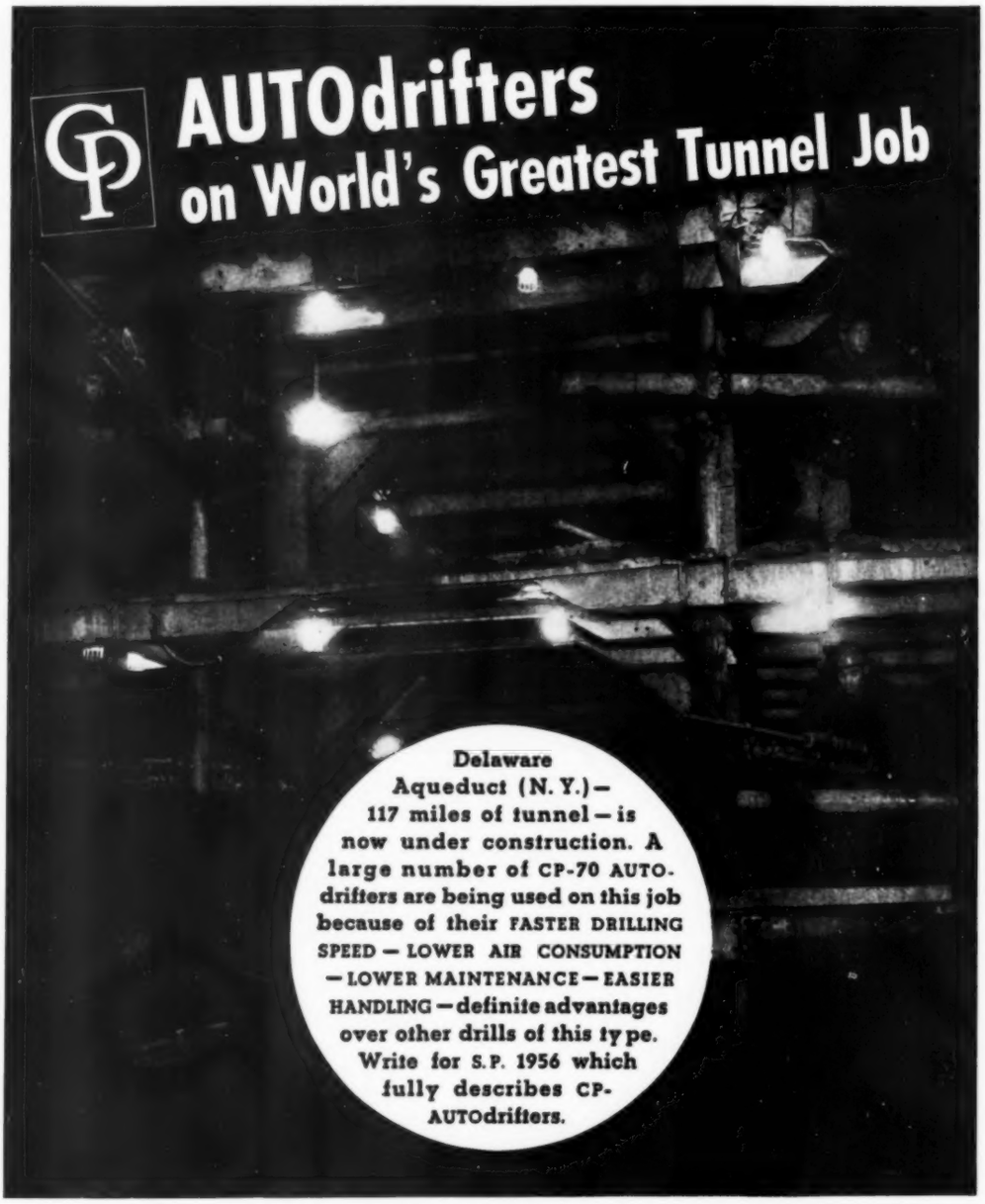
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Accidents Minimized During Snow Plowing

(*Continued from preceding page*)

vada equipment, these lights are so focused that the beams strike the road some 50 feet ahead of the plows, although the lights are adjustable to suit individual operators and snow conditions. Mr. Holesworth has observed that headlights so mounted are apparently less glaring than those mounted in the conventional manner. As these lights are some 10 feet from the ground and pitched forward at a considerable angle, an approaching passenger car driver, because of the difference in heights, can not look directly into the beam unless he is directly in front of the plow and within 50 feet of it. Even in this position, he must lean forward slightly and look upward into the beam before the glare is bothersome. However, there is a disadvantage in this manner of mounting headlights, Mr. Holesworth observes. The higher mounting creates somewhat of an optical illusion as a driver approaching a plow can not accurately place its position, due to the more central and higher mounting of the lights, and usually believes the truck to be further away than it actually is. Under these conditions, Nevada's average drivers apparently slow down and proceed with caution until the snow plow unit is passed, as there has been but one head-on collision at night in the past three years and in that one case, the driver was inebriated and had a bad accident record. In addition to the standard headlights, most of Nevada's equipment has a third headlight mounted on the rear top of the cab for providing light for backing up and other maneuvers.

Mr. Holesworth believes that lighting the rear of snow plows is a greater problem than lighting the front. Nevada has tried many different lighting arrangements and has found none entirely adequate under adverse weather conditions. Tail-lights must be well protected or they are broken off when the truck is turned in the narrow roadway between deep snow banks. Mud, ice, frost and wind-driven snow coat the lenses and dim the lights so they are barely visible during a snow storm, as the slight heat from the light bulb is not sufficient to keep ice or snow from sticking to the lenses. If the tail-lights are moved to a higher position on the rear of the truck, the optical illusion mentioned above becomes a definite hazard. As a red light does not cast the same glow or radiance as a white light, the blank space or void between the tail-light and the road directly under it changes the perspective of the on-coming driver and before he realizes it, he has nearly collided with the rear of the truck.

On the Snogos used by the Nevada Department of Highways, the tail-lights

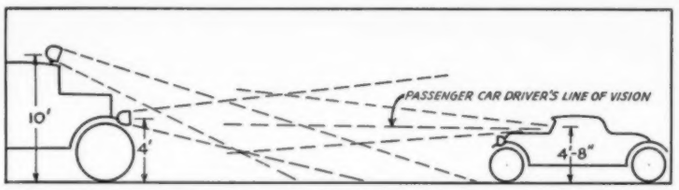

Diagram by W. E. Holesworth, Nevada Department of Highways, to Show How High Mounting of Headlights on Snow Removal Equipment Reduces Glare for Approaching Vehicles—Horizontal Scale Not in Proportion.

are mounted rather high so that the body of the tail-light is within the large hood built over the rear motor of the Snogos. The heat emanating from this motor prevents ice or snow sticking to the lenses. This type of installation has proved very successful.

Traveling Christmas Trees

P. E. Gurvin, Maintenance Engineer of the North Dakota State Highway Department, says that their snow plow trucks look like traveling Christmas trees and are visible for at least a quarter of a mile. These trucks have the headlights mounted on the two front corners of the cab and in addition have two blue lights in the center of the cab, one facing forward and one to the rear. The rear of the trucks meet the standard regulations while most trucks have two lights mounted on the rear corners of the roof of the cab and trained on the body of the truck. In addition, 10-ton trucks and over are equipped with one or two spotlights.

Washington's trucks might also be described as traveling Christmas trees. On the front of each truck are the two headlights raised to the top of cab, alongside of each headlight is an inside-controlled spotlight, and in the center of the top of the cab are three small colored electric lights, two red and one green. On the left side of the truck body are an amber reflector light and an electric light. At each corner of the rear of the top of the cab is a two-way colored electric light, amber to the front and red to the rear, and a row of three small colored lights similar to those on the front of the cab. At the end of the truck chassis are red tail-lights on both sides and a red reflector light at the left corner of the body. The rotary snow plows are lighted in the same fashion, J. D. MacVicar, Maintenance Engineer, reports.

Little Night Plowing in Wyoming

Due to the fact that the majority of snow storms in Wyoming are accompanied by high winds and also because most of the roads have a grade line from 12 to 18 inches above natural

(*Concluded on page 27*)

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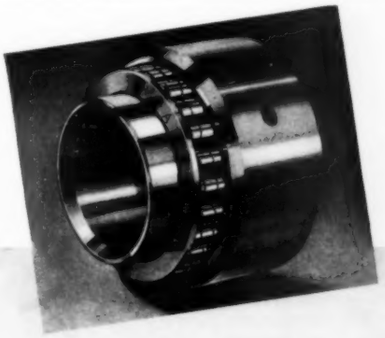

Design engineers looking forward to the many years of long service they must provide in their bearing layout have no compunctions about imposing a virtual life sentence on Hyatts. They know from experience, when they design Hyatts into their equipment that Hyatts are built to give a lifetime of dependable performance. That's why more and more Hyatt Roller Bearings are used year after year in operating equipment.

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One of the Twelve Tournapulls, a New Self-Powered Dirt Mover, In Use by the Guy F. Atkinson Co., at Hanson Dam in California

New Giant Scraper Moves by Own Power

Just prior to the advent of the Carryall scraper, R. G. Le Tourneau experimented with self-powered excavators which would load, haul, dump and spread material. First efforts produced the Mountain Mover, limited in speed to a few miles an hour, to material that was favorable, and to favorable hauling conditions. Then came the crawler-tractor-hauled Carryall unit to meet dirt-moving requirements over short hauls.

Believing that the same low dirt-moving costs can be secured over greater than profitable tractor hauls, R. G. Le Tourneau, Inc., Peoria, Ill., and Stockton, Calif., has now announced its new Tournapull which combines the capacity of a 30-yard self-loading scraper with truck speeds under its own power. This new unit consists of a U-type double-bucket self-loading scraper and a 160-hp Caterpillar diesel engine extending unsupported in front of the 80-inch 2-foot-tread pneumatic-tired wheels. The weight of this overhanging motor is counterbalanced by the weight of the carrying unit and the load in the rear. In this way, maximum traction is secured for the huge driving wheels. The entire weight of the engine together with much of the weight of the load is placed on the two large driving wheels. The 80-inch low-pressure Firestone Earth-Mover tires, the largest ever manufactured for commercial use, spread the tread over a large ground area under the weight of the unit.

The Tournapull is steered much like track-type tractors, by independent control of each wheel. However an additional feature is that one wheel may be held stationary and the full engine power transmitted to the other. Thus, on steep grades or in muck and mire the Tournapull is able to wiggle its way out by a series of semi-circular movements.

An interchangeable hauling unit for the Tournapull is the Tournatrailer, a 30-yard rear-dump buggy consisting of a bottomless body sliding over a fixed bed. The big over-sized body of this unit, which is designed for shovel loading, makes careful spotting of the shovel dipper unnecessary. In dumping, the cable-controlled body moves back over the bed, scraping the load with it and dropping the material through the ever-widening gap at the rear.

Complete information on this new development in dirt-moving equipment, the Tournapull, may be secured direct from R. G. Le Tourneau, Inc., or from this magazine.

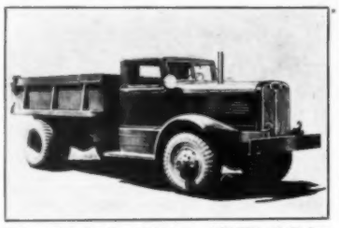
New Blaw-Knox Dealers

The Blaw-Knox Co., Pittsburgh, Penna., has announced the appointment of two new dealers for Blaw-Knox construction equipment. Contractors Equipment Corp., 1215 S. E. Grand Ave., Portland, Ore., has been granted exclusive selling rights for Blaw-Knox Trukmixers, road finishers, clamshell and concrete buckets in the State of Oregon and in Cowlitz, Clark, Skamania and Klickital Counties in Washington. The Motor Equipment Co., Albuquerque, N. M., has been appointed exclusive distributor for B-K construction equipment in New Mexico and in the 21 western counties of Texas.

All-Wheel-Drive Truck With Diesel Engine

A powerful all-wheel-drive truck, driven by a diesel engine, has been announced by the Autocar Co., Ardmore, Pa., in its new Model 4 x 4 CD unit. This 10-ton truck has a 157-inch wheelbase and speeds from 5.1 mph in first to 30.2 mph in fourth and 4.1 mph in reverse for the high range, and 2.1 mph in first to 11.9 mph in fourth and 1.6 mph in reverse for the low range.

The truck is powered with a Cummins 6-cylinder HB-6 diesel engine, with a 4⅞-inch bore and 6-inch stroke, developing 150 bhp at 1800 rpm. A mechanical-type governor is incorporated in the fuel pump and there are two special oil-bath air filters, the filtering elements



The Standard Autocar All-Wheel-Drive Diesel-Powered Truck

of which can be removed for thorough cleaning.

A single-disc dry-plate clutch with woven asbestos facing material and one driven disc assembly is used. A Timken-Wisconsin T-7 transfer case is located amidship with rubber mountings and is equipped with a high traction differential which divides the torque as necessary between the front and rear axles, compensating for any difference in travel between them. A manually operated lock-out is provided for the center differential.

Careful design, supplemented by field studies, has enabled Autocar engineers to develop what is reported to be the easiest steering all-wheel-drive truck on the market. The steering gear is semi-irreversible and adjustable, of the roller bearing, cam and lever type. The 20-inch diameter steering wheel is made of hard rubber over a steel frame, with corrugated hand grips. Full details, specifications and dimensions on the Model CD diesel will be found in Data Sheet 10382 which may be secured direct from the Autocar Co.

Maximum highway congestion is on the radii from metropolitan centers. More than one-half of the population lives in the large metropolitan centers and their suburbs, which indicates that there must be more highway development closely adjacent to these centers. Cities of 100,000 and more population have the maximum traffic density in their environs, Thomas H. McDonald, Chief, U. S. Bureau of Public Roads, reports.

Worlds' largest

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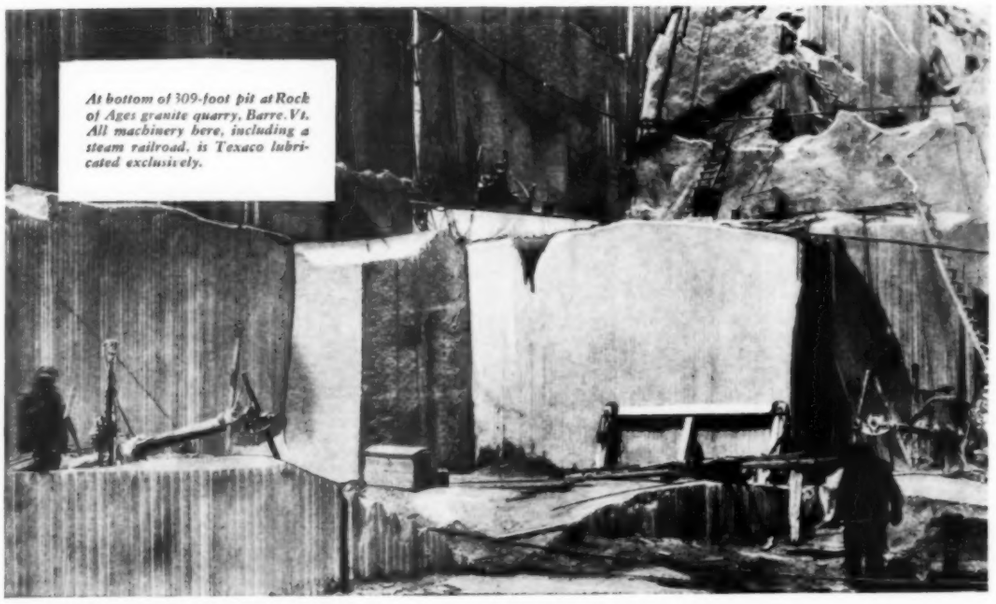
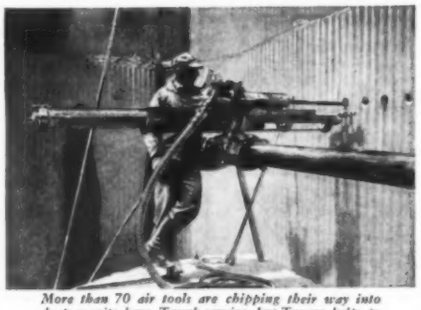


At bottom of 309-foot pit at Rock of Ages granite quarry, Barre, Vt. All machinery here, including a steam railroad, is Texaco lubricated exclusively.



More than 70 air tools are chipping their way into deep granite here. Tough service, but Texaco helps to keep them on the job.

One of the I-R Air Compressors which have a capacity of 9,000 cu. ft. a minute. All are Texaco lubricated.

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PICKS and SHOVELS

By O. E. POTTER

Fish Fries Are Potent Stimuli

With a promise of a fish fry every 1,000 feet of ditch completed, WPA workers on a drainage project for Lee County, Florida, showed considerable enthusiasm to crowd these events as close together as possible. The foreman on the work has a reputation as a cook for such outdoor events and provided an excellent repast of fried fish, cole slaw, corn bread, sliced tomato, swamp cabbage, lemonade and coffee. Cake was furnished by ladies privileged to attend the parties and other food was furnished by Bruce Storer, Commissioner of the District.

The way to a man's heart has long been recognized by domestically inclined females. Apparently productivity on the job may be arrived at by the same route.

Competition

The Sidewalk Superintendents Club at Rockefeller Center lost a lot of members with the advent of the season's first snow. Oh no, it wasn't the bad weather that got them. They are a hardier lot than that. They resigned in a body to watch New York City's new snow removal equipment at work.

Kibitzers Want Comforts

Speaking of the Sidewalk Superintendents Club, we find that the members are crying for more comforts, such as swivel chairs, cocktails, an arm rail so they won't get too tired loafing, and a weekly bank night. Some short people want a special section, others of normal size want something done about women with feathers in their hats, and others finding their jobs interfere with their kibitzing want arrangements made for the work to go on on Sundays.

New Road to Mandalay

"Believe It or Not" Ripley has, in the past, enjoyed confounding his listeners by pointing out that, in spite of the fame of the "road to Mandalay" in poem and song, there was no road to Mandalay. This is no longer true, although the new route does not run from Rangoon but from the other direction. It is, in fact, the recently constructed highway from Sinkiang Province in China through the rugged foothills of the Malaya Mountains, built to provide a back door through which supplies may be shipped into China.

According to an Associated Press dispatch from Paris, Nelson T. Johnson, U.S. Ambassador to China, and an aid were the first civilians to enter Burma by the new route. Ambassador Johnson is quoted as calling China's new road "magnificent."

Mixing 205,000 Pancakes

Concrete mixers have done their jobs, and well, on many kinds of projects but a new one on us was reported from Winona, Minn., where the Junior Chamber of Commerce was faced with the problem of preparing more than 205,000 pancakes for the second annual Pancake Day, to celebrate a bumper wheat crop last fall. Harold E. Murtinger, contractor, of Winona came to the rescue with his Rex 5-S mixer. On the day of the big event, Mr. Murtinger towed his pneumatic-tired mixer to the proper location, showed them how to load, mix and discharge a batch, and let them go to it. During the day, more than 2 tons of flour and 400 gallons of milk went into the batches to produce the 205,000 pancakes.

Once again a piece of prosaic construction equipment rises to the occasion.

Better Built Roads Do Reduce Accidents

According to the Committee on Analysis of Accident Data of the American Road Builders' Association's Safe Highways Committee, the built-in safety features of highways are highly conducive to traffic safety. Over a one-mile stretch of divided-lane highway on Chicago's Outer Drive north of Lincoln Park, the total accident rate for four years was only one in every 40,000,000 vehicle miles. If it had been possible to apply this rate to the 2.25 billion miles traveled by American car operators in 1936, there would have been only 5,625 fatal accidents instead of 37,500 deaths.

The Committee, in its report, lists a number of examples showing certain parts of the highway that have contributed to the causation of accidents. The report also includes examples showing that the results obtained by eliminating faulty highway design are strikingly shown when studies are made of the accident experience for a given location or a stretch of highway before and after improvement. It further states that if our highway systems could be modernized to cope with the speed and density of our present-day traffic it is felt that a reduction of 75 per cent or more of our highway accidents could be achieved.

The three factors in highway safety are the driver, the vehicle and the road. The highways that are being built today are designed and constructed to carry heavy and speedy traffic, but unfortunately this is not true of roads built ten and twenty years ago. We need a two-way program: continued construction of new modern roads and the remodeling of our old highways to meet the demands of today and tomorrow.

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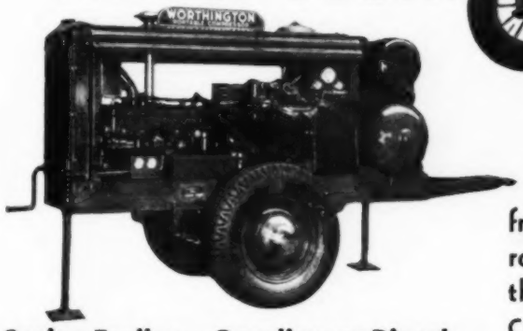

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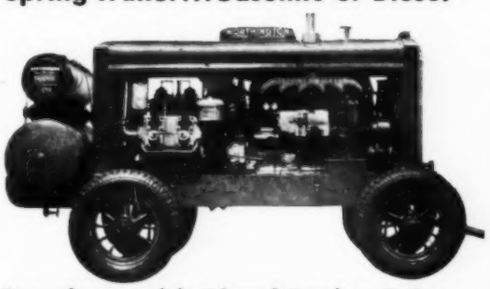

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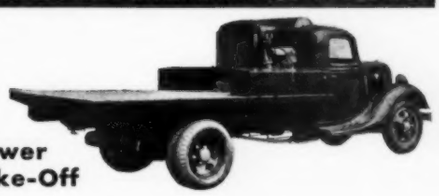

Power Take-Off

Reducing Accidents By Highway Lighting

New Jersey, With Longest Lighted Mileage, Gathers Data on Accident Causes To Determine Future Plans

By E. R. SHERBAUM, Electrical Engineer, New Jersey State Highway Department

(*Photos on page 52*)

✦ THE traffic problems in New Jersey arise from the fact that, owing to its location, this state is a central distribution point for that heavily populated section of the United States lying between Boston and Washington. In addition to the industrial traffic problems, New Jersey is a popular and frequently visited resort state and lastly, there is a very heavy truck traffic of agricultural produce moving toward the New York and Philadelphia metropolitan markets all hours of the day and night.

It is interesting to note that while the average daily volume of cars and trucks on the regular Federal system of highways throughout the country is 1,700 to 1,800 motor vehicles, according to the U. S. Bureau of Public Roads, the average on N. J. Route 25 from the Holland Tunnel via the Newark Airport through Elizabeth and the Woodbridge Cloverleaf is 60,000 vehicles daily. In the section between the Newark Airport and Elizabeth, a record traffic flow was recorded on June 29, 1938, when 102,000 cars passed a definite point during a 24-hour check.

According to U. S. B. P. R. statistics, 7,000 motor vehicles a day is the saturation point on the standard 20-foot concrete highway and 14,000 cars a day on the standard four-lane or dual highway, and traffic above those amounts makes travel on such highways extremely hazardous. It is not surprising then, with this overcrowded condition on state highways in heavily populated areas, that the motor vehicle accident record in New Jersey mounted steadily until in 1937 an average of four persons were killed and twenty-four put in hospitals each day, as compared with three a day killed the year before and eighteen a day in hospitals.

Steps to Determine Policy

Naturally, if sufficient funds were available, the safest policy to follow would be to build into all highways all known safety features, but with seriously curtailed budgets and great relief problems on our hands, this is not possible and the highway safety engineer must try to provide the maximum of safety for a minimum expenditure.

To mitigate the serious accident situation in New Jersey, a very intensive campaign against both day and night accidents on the state highway system has been inaugurated. In general, this plan includes policing, highway lighting, traffic signals, divided highways, lane markings, grade separations, guard rails, electric and reflectorized direction signs, white reflecting curbs, traffic circles and all other known safety features.

In our campaign against night accidents, after studying all available data on the subject, the State Highway Department decided to find out for itself the actual relationship between highway lighting and the night accident rate in New Jersey. Accordingly "accident laboratories" were inaugurated.

Experimental Projects

To find out whether or not large expenditures for straightaway highway lighting could be justified at this time, Commissioner E. Donald Sterner directed that careful and complete studies be made of the subject and three stretches of the highway system were elected as "accident laboratories." On these sections, 24-hour accident patrols were inaugurated, three men alternating every eight hours, riding back and forth continuously over about 5-mile stretches marked out in stations of 200 feet so that accidents could be accurately spotted. Traffic counters were stationed at strategic locations to record traffic volumes, so that certain ratios of accident rate and traffic flow could be established. The men on accident patrol cruise back and forth along the section assigned to them all the time and when an accident happens, after rendering assistance to anyone needing first-aid attention, they gather complete information concerning the accident, its cause, the condition of the car and driver, the weather, the condition of the pavement, and all data pertinent to a proper analysis of the cause. This information is forwarded daily to the main office at Trenton, where especially trained safety engineers carefully analyze the contributing factors and classify the accident under one of several well-defined types.

In this way, the principal causes of the majority of the accidents on each type of road can be ascertained which in turn permits various preventives, such as divided roadway, white indented curbs, highway lighting, traffic signals, signs, etc., to be prescribed. In cases where an existing road is to be widened or converted into a divided roadway, these studies carried on before and after the construction changes make it possible to determine the effect on the number and type of accidents produced by these corrective measures, and when the surveys are complete will make it possible to predict with a fair degree of accuracy the proper type of safety fea-

(*Continued on page 40*)

Lighting Saves Lives

In the sixteen counties of New Jersey where modern state highway illumination was inaugurated during 1937, a recently completed survey shows that 154 persons died in state highway accidents after dark in the sixteen counties during 1938 as compared with 245 in 1937, a decrease of 37 per cent, notwithstanding a marked increase in the volume of traffic during 1938 and although some sections of lighting were not erected until the latter half of the year. Day accidents in the same sections in the same period showed only a 3 per cent decrease.

These reductions in night-time accidents as a result of New Jersey's safety lighting program were accomplished at a cost to the state and the municipalities of less than $500 per person saved from injury or death.

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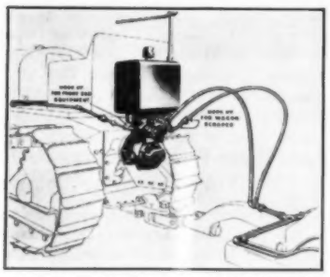

A New Hydraulic Power Control Unit

New Hydraulic Pump For Wagon Scrapers

An hydraulic pump unit designed primarily for furnishing power to the hydraulic jack that operates wagon scrapers, as well as other construction and road building equipment that is hydraulically operated, has been announced in improved form by the Continental Roll & Steel Foundry Co., Tractor Equipment Div., Railroad Ave., East Chicago, Ind. The Be-Ge hydraulic pump now serves a dual purpose. It is made with convenient extra outlets for operating tractor front-end equipment such as bulldozers, angle blades, loaders and shovels. Tractors equipped with front-end equipment can now be used simultaneously to pull wagon scrapers, it being necessary only to open or close a single valve, depending upon which equipment is to be used.

The pump, which is connected to the tractor rear power take-off, is simple and provides a high volume delivery of pressure. It operates at zero pressure when not under load. The valve control has a spring-loaded neutral return and operates easily because of the hydraulic balance. Literature may be secured direct from the manufacturer by mentioning this item, or from CONTRACTORS AND ENGINEERS MONTHLY.

Line of Strainers For Power Pumps

To get the maximum service with any power pump, it must be equipped with a strainer to keep trash from the suction line, and the strainer must have ample open area. Rife Hydraulic Mfg. Co., 75 West St., New York City, makes four different-sized strainers to use with each size of self-priming or foot-valve pump and these strainers have open areas 5, 10, 15 and 20 times the pump suction.

The 5-area strainers are for use in construction pits where access for cleaning is easy. The large bottom plate and limited height holds the suction vertical and the long water line gives easy inflow. The 10-area strainers can be used in construction pits under extreme conditions, but they are intended for use with clear water pumps or moderate capacity sumps. The 15-area strainers are designed particularly for use on busy subway sumps where there is a large flow and a lot of floating matter or when pumping from a stream or lake where there is floating material or ice which might block the suction.

The foot-valve strainers are made in three parts, a top malleable iron casting threaded for a standard suction pipe, a cage with a bottom and side of No. 10 steel, and a solid bottom plate and slots $\frac{3}{8}$ x 1½-inch cut in the side plates. A one-piece untearable rubber sheet is used for the gasket-hinge-and-flap. After galvanizing, the pieces are coupled with stainless steel stud bolts. The strainers for complete drainage of construction pits and sumps have extended inner tubes with a solid bottom plate to prevent their sinking in mud or quicksand. While these strainers are made either round or square, it should be remembered that a square strainer has 27 per cent more surface area than a round one of the same diameter.

New 7-S and 10-S Concrete Mixers

The new 7-S and 10-S Model V mixers, recently announced by the Ransome Concrete Machinery Co., Dunellen, N. J., are claimed to have twenty-one star features incorporated in their design and construction.

These mixers, which are the product of over 50 years of mixer construction experience, have heavy steel channels welded in a one-piece chassis, with two extra cross members for drive support and two extra longitudinal members for supporting the drums, and rollers provide an extra degree of resistance to strain, wear and shock. Drum roller shafts are of extra heavy specially treated alloy steel and adjustable, to compensate for wear on rollers and traction rings, thereby keeping the drum correctly centered at all times. The specially designed mixing blades produce a fast and thorough mixing action. Positive water control is provided by the Ransome spiral cut-off water tanks, which are easily adjusted to the proper setting for the required amount of water and, once set, deliver the exact amount of water, unaffected by the slope of the ground on which the mixer may be working.

Power is furnished by a gasoline engine, fully enclosed in a steel housing, and provided with a screen-type air cleaner. Centralized controls at one side of the mixer provide for quick easy operation by one man. These mixers are available with two or four wheels for side or end discharge. For easy transportation, the trucks are full spring suspension, with all wheels mounted on roller bearings.

Bulletin 154 describes and illustrates these and other features of the new Ransome 7-S and 10-S mixers and copies may be secured direct from the manufacturer or from this magazine.

No. 68 TOLEDO CONCRETE WHEELBARROW

For Profit Loads

5 cubic feet capacity. Weight 82 pounds. Heavy channel steel legs with renewable shoes. Iron cross bars over the frame and under the tray for added strength and support.

Steel wheel is regular equipment, but all barrows can be pneumatic-tired at extra cost.

Get complete information from your supply house, regarding the full line of Toledo Wheelbarrows, Concrete Carts and Drag Scrapers, or write to us for catalog, sending your jobber's name.

TOLEDO WHEELBARROW CO.
TOLEDO, OHIO

"She's a drillin' fool" ...that CLEVELAND H10!

That's the sort of comment you hear when men who know rock drills take hold of the Cleveland H10, or watch it in operation. The H10 is not only outperforming other drills in the same weight class, but is excelling even the heavier machines in inches per minute, and in inches per cubic foot of air consumed.

You want the best sinkers your money will buy —let us demonstrate in your own ground, with your own operator. The H10 is shown in our Bulletins 110, 122, and DM-1391. It is furnished with either tee handle, as illustrated, or with spade handle. The wet type fully complies with the requirements of states having silicosis prevention laws.

A complete line of Hand Held Drills, Wagon Drills, Paving Breakers, Clay Diggers, Tampers, and Accessories.

APPROVED N.Y. STATE B. S. A. 2339

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THE CLEVELAND ROCK DRILL COMPANY
3734 EAST 78TH STREET • CLEVELAND, OHIO
Cable Address: ROCKDRILL

LEADERS IN DRILLING EQUIPMENT

Well-Prepared Base For County Road-Mix

(*Continued from page* 19)

work. A 9-foot blade has been ordered for future work, leaving the larger machine for heavy ditch cutting and similar service. In the mixing the material was worked to the center from the two sides and then rolled first to the right side in two or more cuts and then back to the left side in a similar way and finally spread 14 feet wide in the center of the road.

The thoroughly mixed aggregate was then shot three times with 0.3 gallon of RC2 per square yard, based on the 18-foot roadway, and between each shot was mixed in the same manner the aggregates had been mixed as described above. The mixing was done in 2,000-foot sections as these could be handled readily in the 7½-hour working day and the distance fitted the size of the distributor.

After the third shot and subsequent mixing had been completed, the material was spread to a width of 18 feet and rolled once with a 5-ton Galion 3-wheel roller and closed to traffic overnight. The next day the road was rolled longitudinally all day and then closed to traffic for two more days to permit curing of the cut-back asphalt. On the third day the surface was lightly covered with hand-cast sand and opened to traffic. If dry sand was available, the tailgate of the truck was just split and the truck traveled as fast as possible down the road, leaving the required dusting of sand on the surface in its wake.

Throughout this work the asphalt was applied at a temperature of 130 to 140 degrees F. After the road has been in service for about one year, and in the next dry season it will be resealed with 0.2 gallon of the RC2 and covered lightly with sand.

This project was a cooperative county and WPA project in which the county furnished the trucks, sand, all equipment and some of the asphalt. In all, the county put up about 32 per cent of the gross cost of the road and the WPA furnished all labor.

County Organization

There are 614 square miles in Harrison County, and 1,240 miles of county road of which 150 miles are paved, divided about half and half between road-mix and plant-mix. The county is divided into five districts, each with its own elected Supervisor who is responsible for construction and maintenance within his district. Together they comprise the Board of County Supervisors and administer the road funds of the county. These funds come from an ad valorem tax on real estate and the money left over from the division of the county's share of the state gas tax after the seawall has been maintained and road protection bonds and interest has been paid and the proper amount paid into the sinking fund.

As a contribution to more effective construction of turn-outs at road intersections and bridge approaches, the county pre-mixes in a concrete mixer RC2, gravel and sand in the same proportion as the road mix for use at these points.

New Air-Compressor Catalog

A new catalog describing the Sullivan large semi-portable air compressor has recently been issued by the Sullivan Machinery Co., Michigan City, Ind. This catalog includes complete specifications of the three sizes, 445, 550 and 720 cfm actual delivery; tables showing the number of tools which can be operated from each size; photographs of direct-connected and V-belt-driven

C. & E. M. Photo

Mixing the Windrow After the Material Had Been Bladed from Both Sides of the Road to the Center

models with gasoline, diesel and electric drive; and numerous job photographs showing the WN-102 at work on road construction, tunnel driving, dam construction, and in quarries.

Copies of this Bulletin A-23 may be secured by those interested direct from the manufacturer or from this magazine.

Soil-Cement Road Mixtures

A symposium on soil-cement mixtures for roads has recently been published as Part II of the *Proceedings* of the Seventeenth Annual Meeting of the Highway Research Board. Experiments with soil-cement roads were started in 1932 and have been continued by the Portland Cement Association and by various state highway departments.

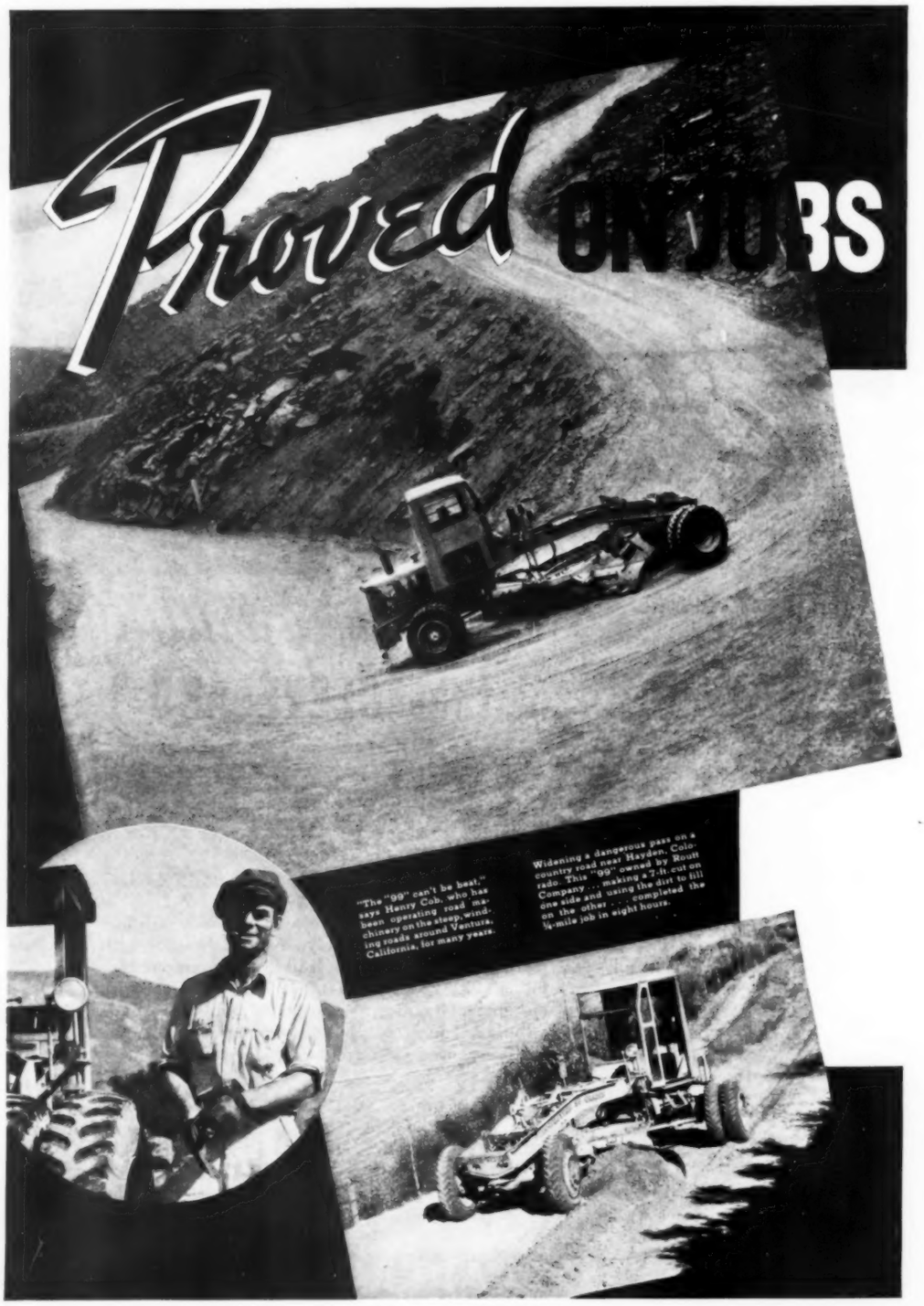
In order that the results of these researches and experiments might be made available to state and county highway engineers, contractors and others interested in this type of road construction, reports prepared by the state highway departments of Illinois, Iowa, Michigan, Missouri, Wisconsin and South Carolina and by the Portland Cement Association were collected for the Project Committee on Stabilized Roads of the Department of Soils Investigations, Highway Research Board, of which C. A. Hogentogler is Chairman.

These reports make up the 105-page book "Soil-Cement Mixtures for Roads," copies of which may be secured by interested contractors and engineers from the Highway Research Board, 2101 Constitution Avenue, Washington, D. C., or from Contractors and Engineers Monthly. Price: $1.00.

Four-Rear-Wheel Drive For Chevrolet Trucks

The Thornton four-rear-wheel drive to convert light Chevrolet trucks into heavy-duty units are described in new literature recently issued by the Thornton-Tandem Co., Detroit, Mich. This Thornton drive is designed to give doubled payload capacity plus the added ability to perform equally well under difficult off-the-road conditions and on inter-city highway hauling operations.

Copies of two bulletins describing the merging of a Chevrolet truck and a Thornton four-rear-wheel drive and the engineering and performance features of the drive may be secured direct from the manufacturer by mentioning Contractors and Engineers Monthly.


Proved ON JOBS
"The "99" can't be beat," says Henry Cob, who has been operating road machinery on the steep, winding roads around Ventura, California, for many years.
Widening a dangerous pass on a country road near Hayden, Colorado. This "99" owned by Routt Company . . . making a 7-ft. cut on one side and using the dirt to fill on the other . . . completed the ¼-mile job in eight hours.

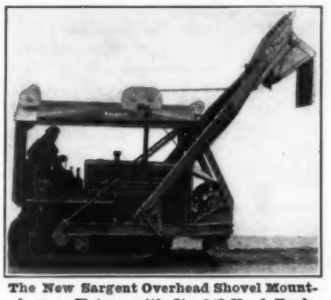
New Overhead Shovel A Versatile Machine

One of the features of the new Sargent Overhead shovel, a tractor attachment for loading and moving earth and similar material, is that by the addition of an interchangeable group of comparatively inexpensive accessories, a standard crawler tractor with a single operator has the versatility of several separate machines.

Fundamentally the Overhead shovel is a fast dirt shovel, capable of hard digging, and made in sizes of 3/8-yard and larger. A bulldozer blade with down pressure can be hooked onto the shovel in 15 minutes, or in half an hour the unit can be converted to a snow loader. None of these accessories interferes with the use of the tractor for ordinary tractor work. When used as a dirt shovel, it is equipped with a cast alloy steel bucket shell with digger teeth. Its crowd is secured by backing the tractor. When filled, the bucket is hoisted straight up over the tractor and dumped in front by tripping a hinged cover. It can load into high trucks. A caster wheel under the front of the shovel frame protects the tractor springs from the load of the bucket when being dumped. Two hand levers and a foot brake operate the shovel so that one man can operate both the tractor and shovel. A reinforced steel roof protects the operator at all times.

The bulldozer blade is installed by inserting four connecting pins. The blade and arms are ruggedly built to utilize the full force of the tractor. The bulldozer has down pressure backed up by the total horsepower of the tractor and the blade can be lifted 26 inches. When the blade is lifted, the tractor balances almost on the center of its tracks.

A novel use for the shovel with the dirt bucket is pushing over trees, commonly done by tractor and bulldozer. Because the shovel bucket can be raised more than three times as high as a bulldozer blade, the leverage on the tree is increased accordingly.



The New Sargent Overhead Shovel Mounted on a Cletrac with Its 3/8-Yard Bucket in Dumping Position

The Sargent Overhead shovel is manufactured by Maine Steel, Inc., South Portland, Maine, manufacturer of Sargent snow plows. At present this shovel is available for Cletrac tractors only but it is planned to make them available eventually for all standard makes of crawler tractors. Literature describing this new piece of equipment may be secured direct from the manufacturer.

THAT "CAN'T BE DONE"

Whether turning a sharp corner or working a super-elevated curve, the "99" holds the road floor to a perfect grade . . . without gouging or wasting.
In Minnesota they want their ditches deep. And the "99" delivers the goods, as shown by this example of "99" performance on a typical ditching job.

● Easily negotiating 8 to 16 per cent grades without stopping, or the blade losing its load . . . working more than fifty hairpin turns without backing . . . the A-W "99" 4-Wheel Drive—4-Wheel Steer Motor Grader is shown making a maintenance run up Pike's Peak. The "99" made the climb in second and third gear, at 2½ to 3½ miles per hour.

Your working conditions may not call for such spectacular performance. But distinctive "99" features that make such performance possible help you do your jobs better . . . do more kinds of work, for more days of operation each year.

With a "99" you can make accurate blade adjustments without stopping . . . turn around in half the time . . . follow a sharp curving ditch line without backing up . . . pull deeper ditches . . . handle a full load on the blade without side slip and with never a wheel in the windrow.

The greater traction and driving power . . . made possible by 4-wheel drive and steer . . . so multiplies the "99's" fields of usefulness that it often saves the cost of a tractor for bulldozing, pulling a blade grader, a sheeps foot roller, etc.

See this versatile machine in action on all the jobs it can do for you. Then you'll agree, IT'S THE "99" FOR '39 . . . and for the years to come.

THE AUSTIN-WESTERN ROAD MACHINERY CO.
AURORA, ILLINOS

Distinctive Lights For Snow-Plow Units

(*Continued from page 21*)

ground, this state does not do very much night plowing, except in special cases when the roads are blocked. Under such conditions, there is practically no traffic on the roads and snow plowing does not constitute a major night traffic hazard. However, all trucks are equipped with lights. In addition to the headlights mounted on each side of the top of the cab, one spotlight is also mounted near the top of the cab for use both front and rear. Clearance lights are used on all trucks and green and red cluster lights across the front and back of the cab. J. G. Smith, District Engineer, reports that this state has tried using both lights and reflectors on the snow plows themselves, but neither has been very satisfactory, as they are broken off in a very short time, especially where the plows are used to buck snow drifts.

Conclusions

In these states whose snow equipment lighting systems have been described, collisions with such equipment have been reduced to a minimum or eliminated. This has been accomplished by the adoption of a lighting system which is not only adequate to enable operators to see what they are doing and thus work safely but which is also so distinctive that the traveling public at once recognizes a snow plowing unit and takes the necessary care in passing it. People who are driving cars in a bad snow storm are generally tired, confused, uncomfortable and in a hurry to reach their destination and be out of the storm. It is therefore necessary that more than the usual safety precautions be taken to prevent accidents. Thoroughly adequate and distinctive lighting on snow removal equipment aids in bringing about the ideal of safety on the highway and in addition brings to the realization of the public traveling during bad storms that its state highway department is on the job, providing open and safe highways regardless of the weather.

New Standards on Petroleum Products and Lubricants

The 1939 edition of the A. S. T. M. Standards on Petroleum Products and Lubricants, just issued by the American Society for Testing Materials, contains in their latest approved form sixty-one test methods standardized by the Society through the work of its Committee D-2 on Petroleum Products and Lubricants, eight specifications, and two lists of definitions pertaining to materials for roads and pavements. In addition to this, there is also included the current report of Committee D-2 itemizing the numerous changes in the standards and giving the latest revised diesel fuel oil classification.

Copies of the 311-page publication may be secured from the American Society for Testing Materials, 260 South Broad St., Philadelphia, Penna. Price $2.00.

Tractor Treads

A set of tractor treads used to wear out completely in one winter of severe snow plow service, according to the records of a Mid-Western state. Treads hard-faced with a non-ferrous hard-facing alloy were still in excellent condition after a winter's service. The records also show that the cost of hard-facing a set of 58 cleats, inclusive of labor and material, averages $43.75, whereas at the same time a new set of treads cost $700. Besides the actual dollar saving, the hard-faced treads actually provide better traction.

A Mountain of French & Hecht Wheelbarrow Wheels Ready for Their Pneumatic Tires and Their Eventual Destination—Construction Jobs

Pneumatic Tires for Barrows Gain Favor

The mountain of wheelbarrow wheels shown in the above illustration, representing a single order to a single customer of French & Hecht, Inc., Davenport, Iowa, and Springfied, Ohio, manufacturer of all types of wheels, would seem to indicate that pneumatic tires for wheelbarrows have gained considerable favor by reducing job costs as well as operator fatigue.

Practically unknown three years ago, pneumatic-tired wheelbarrows are now in use by the thousands, and actual field service has demonstrated that heavier loads may be handled, that those loads are easier to balance, and that speeds of travel are definitely increased with an actual lessening of effort. Because the tires afford shock absorption, fatigue-creating arm and shoulder shocks are eliminated, and the effort and expense of planking is often done away with because pneumatic-tired wheels negotiate slopes and rough ground or travel over soft ground without sinking in.

Central Mixing Plant For Capital Bridge Job

The Penker Construction Co., contractor for the Pennsylvania Avenue Bridge in Washington, D. C., recently installed in its Blaw-Knox central mixing plant a newly developed composite weighing batcher. The plant consists of a 2-cubic-yard batcher for cement and three classes of aggregates.

The aggregate bin is a three-compartment unit of 120 tons capacity, supplemented by an auxiliary cement pocket of 15 barrels capacity. One of the unique features of this Blaw-Knox proportioning unit is that all filling gates and the discharge are mechanically interlocked. Only one filling gate can be opened at a given time and the batcher discharge gate cannot be opened when any one of the four filling gates is open, or vice versa. All five gate levers are grouped closely together in front of the batcher for the convenience of the operator. Further details regarding this type of composite weighing batcher may be secured direct from the Blaw-Knox Co., Pittsburgh, Pa., or from this magazine.

Tough Rock Rooted, Scraped in Penna.

On a 50 per cent rock job on U. S. 22 near Armagh, Pa., the Harrison Construction Co. departed from the traditional blasting and shovel method of handling the rock. They moved on to the job in midsummer, 1938, with four LeTourneau Carryalls, two Angledozers, and a heavy-duty single-tooth rooter. The rooter, pulled by a D8 tractor, broke up the rocks sufficiently without blasting, so that they could either be loaded by one of the large scrapers which averaged around 8 yards per trip in shale, rock and dirt, or they were mud-capped and dynamited and then worked into the fill which was a maximum of 54 feet high. Many of the rocks weighed from 500 pounds to 2 tons.

The 3 miles of highway relocation and the elimination of steep grades and bad curves, requiring the moving of 115,000 yards of shale and dirt, was completed early in October.

New A-C Generators

Columbia Electric Mfg. Co., 4510 Hamilton Ave., Cleveland, Ohio, has expanded its line of alternating-current generators to include sizes ranging from 1½-kva up to and including 300 kva in a wide range of speeds, suitable for use with gas, gasoline or diesel engines. The generators are compact, Timken-bearing equipped and are available with complete switchboards and voltage regulators.

Literature describing this line of a-c generators may be secured direct from the manufacturer by mentioning this magazine.

"TOPS—1939"

Contractors say "FLEX-PLANE" equipment is "tops" *and we are inclined to agree with them.* See our famous "FLEX-PLANE" finishing machine with single wide screed—vibration and gas electric—and our three models of joint installing machines.

FLEXIBLE ROAD JOINT MACHINE CO.
WARREN, OHIO

CUMMER Asphalt Plants

All styles and sizes for HOT or COLD Mix

Heavy-Duty Mixers

45 Years' Experience

Write for literature

THE F. D. CUMMER & SON CO.
17th and Euclid Ave.
Cleveland, Ohio

"Reckon I put tew much volatility in thet batch!"

THERE'S nothing as dramatic as an exploding moonshine still to tell you that the gasoline you use in your trucks or buses is too volatile or not volatile enough. There is plenty of practical evidence in the way those trucks and buses run.

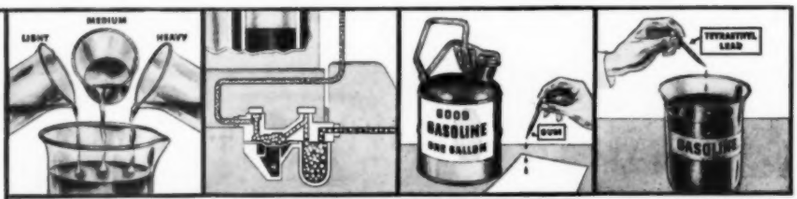
When gasoline does not have enough volatile fractions, or light ends, it shows up in slow starting and repeated choking, resulting in crankcase oil dilution and poor mileage. The superabundance of heavy ends in such gasoline also contributes to fuming and obnoxious exhaust odors.

When gasoline has too many highly volatile fractions, it causes vapor lock and poor mileage, the latter due to excessive evaporation from gas tank and carburetor vents.

How can you be sure of avoiding both these extremes? By buying gasoline with balanced volatility—enough light ends or fractions for quick, easy starting, and enough medium and heavy ends to supply the power for sustained economical operation. The best way to be sure of getting this kind of gasoline is to buy from a reputable oil refiner or marketer. When you do, you'll usually find other advantages in the same gasoline—correct vapor pressure, low gum content and high anti-knock value.

If you have any questions on bus or truck fuels and their specifications or characteristics, write or get in touch with the Ethyl Gasoline Corporation, Chrysler Building, New York, N. Y., manufacturers of anti-knock fluids used by oil companies to improve gasolines.

4 Rules For Good Gasoline



VOLATILITY should be balanced, for full power and best economy.

VAPOR PRESSURE should be adjusted to meet operating conditions.

GUM CONTENT should not exceed ¼ of a gram (4 small drops) per gallon.

ANTI-KNOCK VALUE should be high, of at least 68 octane number.

THE BETTER THE GASOLINE THE BETTER THE PERFORMANCE

The Spindle Wagon for Cotton Rolls Used on the Pyramid Lake Road, Nevada

Nevada Tests Cotton in Road

Four One-Mile Sections on Pyramid Lake Highway Show Interesting Results

✦ TO determine the practicability of the use of cotton fabric as a road construction material, the Nevada Department of Highways, in cooperation with the U. S. Bureau of Public Roads, constructed in 1937 an experimental section of road on the Pyramid Lake Highway, using cotton fabric as a reinforcing surface layer. Although many similar projects have been carried out in a number of other states since the Department of Agriculture made available the necessary material to those state highway departments willing to cooperate in the experiment, this was the first of its kind to be undertaken in Nevada.

Because of climatic, moisture and traffic conditions, it was believed that the Pyramid Lake Highway afforded a representative test of Nevada conditions. The experiment was limited to four short sections of about one mile each, one section being treated with the fine-mesh light-weight cotton fabric, another with the medium grade, a third with the coarsest and heaviest material, and the fourth given identical surface treatment without the cotton membrane.

Construction Procedure

The roadway material consisted of a disintegrated granite. The existing surface was scarified and shaped to grade and cross section, with a crown of not less than 0.1 and a minimum width of 20 feet. After all depressions and irregularities had been eliminated, sufficient water was applied to facilitate compaction, after which the surface was rolled with a power roller.

A prime coat of asphaltic material Type SC1A was then applied at the rate of 0.25 to 0.33 gallon per square yard. After the prime coat material had penetrated and dried, the surface was swept free of all loose material with either hand or power brooms. Next a tack coat of emulsified asphalt was applied at the rate of 0.33 gallon per square yard. This was followed immediately by the placing of the cotton membrane, which comes in rolls of approximately 500-foot lengths. The cotton was spread longitudinally in overlapping strips, covering the full width of the primed surface. It was found necessary to slow up the application of the emulsion so that the cotton fabric could be placed before the emulsion broke.

Crushed rock or gravel screenings, graded from ½-inch to No. 10 mesh, was then spread at the rate of approximately 20 to 25 pounds per square yard. This was followed by a second application of emulsified asphalt at the rate of 0.5 gallon per square yard. More rock screenings, from ¼-inch to No. 10 mesh in size, was spread at the rate of 10 pounds per square yard, and the surface rolled with a tandem roller weighing a little over 5 tons.

This same procedure was followed in constructing the one section without the cotton fabric reinforcement.

The costs per mile were $1,815.50 for the sections with the cotton fabric and $1,729.09 for the one-mile section without the cotton fabric. Thus, the additional cost of placing the cotton fabric amounted to $86.41 a mile.

Handling the Cotton

To facilitate the laying of the cotton membrane, the maintenance section of the Highway Department devised and built, in the Reno shops, a mobile unit light enough to be hauled by two men. Receptacles for spindles were fastened on this unit. One roll of cotton, being comparatively light in weight, was placed on the spindle and mounted on the rear of the mobile drag unit, from which it unrolled freely. As much as 1,800 feet of cotton-treated surface was finished in one day.

At the selected starting point on the road, the end of the cotton roll was fastened to the surface. The spindle unit was then drawn forward, the fabric unrolled, and two workers, one on each side, trampled the edges of the fabric in proper alignment. After it was laid, the fabric adhered to the road surface sufficiently to hold it in place. The cotton strips were laid with an overlap of approximately 8 inches.

Results of Experiments

These sections, in place for over a year, have gone through one winter

(Concluded on page 49)

COMPLETE
WELL POINT SYSTEMS
WILL DRY UP ANY EXCAVATION
Faster—More Economically
Write for Job Estimate and Literature
COMPLETE
MACHINERY & EQUIPMENT CO., Inc.
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PRISMO

SHOWS UP AT NIGHT—IS EQUALLY EFFECTIVE BY DAY

The Prismo Process includes the introduction into special, semi-plastic paint of thousands of microscopic spheres. These tiny spheres of glass return light to its source so that a sign, marker or road stripe glows visibly and intensely. These spheres, of uniform size, reflect the color of the paint in which the LOWER HALF of each sphere is embedded.

To the driver they appear luminous from every angle, without sacrifice of day-time visibility.

It is the most economical, practical method yet devised by science to make road-marking more visible to the driver, thus cutting down the accident ratio, and eliminating the costly, unnecessary road hazards by proper illumination.

It is economical in its application and has a long, useful life. (Facts about road tests under actual conditions are available from our offices.) It outlasts ordinary paint by many months.

For obstructions, bridge abutments and parapets, railroad gates, road shoulders, utility poles, casual hazards, etc., we have created Prismo Fiberglas—easily applied.

Any size, shape or design of highway sign or marker (embossed or flat) can be processed and made luminous by use of Prismo materials.

Your request for information will be promptly answered and all the facts will be placed in your hands by competent, skilled men.

PRISMO SAFETY CORPORATION
HUNTINGDON, PENNA.
DIVISION OF JOHN R. WALD COMPANY

SAMPLES SENT GLADLY—WRITE TODAY

Below is an unretouched photograph taken by the lights from an average car. The disks at the sides of road are 100 ft. apart. You can count the distance that PRISMO markers and Prismo Life-line are visible. **This is added safety** plus.

Coolidge Bridge

(*Continued from page 12*)

at the Northampton end of the project the contractor had his own siding where the batching and Pumpcrete units were located. All aggregate was trucked in and stockpiled adjacent to the batching plant which was served by a Browning locomotive crane with a 70-foot boom which also acted as yard crane, handling every conceivable material in the construction of the bridge when it went through the yard. The Dragon bulk cement, the only portland cement manufactured in New England, was received in Boston & Maine or Pennsylvania Railroad steel cement cars and handled from the cars through two traps beneath the track to the 300-barrel cement storage bin by a complete Butler spiral conveyor and bucket elevator system.

The bulk cement from the storage bin was delivered to the weighing batcher by a sloping spiral feed. The Butler batching plant consisted of three bins for the two sizes of stone and the sand and a separate Ransome water-measuring tank. The batches for Class A concrete, for 12-inch walls and larger, designed for a strength of 3,000 pounds, but which produced concrete of 3,500 to 4,000 pounds, consisted of the following weights of the various materials:

¾ and ½-inch stone mixed	1,000 pounds
1¼-inch stone	900 pounds
Sand	1,475 pounds
Cement	540 pounds
Water	34 gallons

(The weights given include the water content of the aggregates)

The batches were delivered directly to a 1-yard Ransome non-tilting mixer driven by a Hercules engine. The standard mix was 1¼ minutes when delivering to the agitator trucks used for transporting concrete to the abutment pours, and 2 minutes when delivering to the Pumpcrete unit. The water-cement ratio was 6.75 gallons of water per bag of cement.

The batching plant was well protected for winter concreting by wooden housing around the entire plant and with steam pipes under the aggregate piles and in the batcher bins. The water for the mix was heated by a steam boiler so that the concrete delivered to the job had a temperature of 70 degrees. After pouring a pier in zero weather the entire structure was covered with tarpaulin held away from the pier by a frame and the space between filled with live steam.

Pumpcrete Operations

The No. 180 Pumpcrete single pumping unit was located directly below the mixer with the Pumpcrete agitator hopper between. The 7-inch outside diameter line for the concrete with special tight, easily opened and made joints was carried under the end of the old highway bridge and thence onto the temporary trestle as described above. It was not protected from the cold in any manner during the winter and the concrete was delivered to the forms with little loss of heat. There were a few troubles experienced, notably one that should be guarded against. At one point during the work the Pumpcrete line was carried beneath the temporary trestle and thence up on the other side to the delivery hopper. Instructions had been given to clean out the line every night and see that no water was left in the line. When operations were started one morning after a particularly cold night, the Pumpcrete line did not deliver the concrete after a sufficient amount had been delivered into the line to insure positive delivery. By tapping the line for its entire length it was found that the concrete did not go beyond the inverted siphon section beneath the trestle. The line was opened back of that point and the concrete shot out with great force. It was found that the line had been cleaned but that the water had not been drained from the low point after cleaning and had naturally frozen. After this was corrected the line worked excellently with proper maintenance for the remainder of the winter.

C. & E. M. Photo

Vibrating Concrete During a Pour at the Northampton Abutment of the Coolidge Bridge

At the end of the Pumpcrete line the pipe rose about 12 feet to the top of the hopper from which the bottom-dump buckets were filled. For the concreting of Pier 3 the line was extended to its maximum distance on the temporary trestle. The compensated length of the line was 1,027 feet. For the work on Pier 4 the line was carried up onto the old railway bridge for the half that had not been demolished and thence across to the pier where it was handled similarly to the work on the other piers except for some chuting.

The output of the mixer was 30 cubic yards of concrete per hour while the Pumpcrete unit could handle at maximum capacity only 22 to 24 cubic yards per hour. The variation in output of the pumping unit was due chiefly to the time required for the starting and cleaning operations which required a proportionately larger amount of time on small pours than on long ones. Also the actual distance the concrete was being pumped somewhat cut down the hourly production.

Concreting Abutments

For the concreting of the Northampton abutment the concrete was delivered to a Blaw-Knox agitator truck of 3 yards

(*Concluded on next page*)

I "TOOK A TEST" and DODGE IS THE TRUCK FOR ME!

IT LEADS THE LOW PRICE FIELD IN 5 VITAL WAYS!

IT'S EASY TO SEE THAT DODGE LEADS IN PRESTIGE-BUILDING STYLE AND THAT'S A REAL BIG ASSET!

YES AND ONLY DODGE IN THE LOWEST PRICE FIELD HAS RUST-PROOFED SHEET METAL, CABS AND PANEL BODIES!

I TRIED DODGE HYDRAULIC BRAKES AND THEY SURE GIVE SMOOTH, QUICK, SAFE STOPS!

MY CHECK-UP SHOWS TOUGH "AMOLA" STEEL IN VITAL PARTS LIKE SPRINGS AND AXLES!

I'VE FOUND OUT THAT ONLY DODGE HAS A 6-CYLINDER L-HEAD ENGINE WITH 11 SPECIAL ECONOMY FEATURES!

7 "Truck-Built" Engines... (201 cu. in. to 331 cu. in.) ENABLE DODGE ENGINEERS TO MATCH POWER EXACTLY TO HAULING CAPACITY

½-Ton Dodge Pickup, 116" W. B. 48¼" x 78½" Body. Price delivered at Detroit, including Federal taxes, front bumper, 4 double-acting hydraulic shock absorbers and spare tire $590.00

Shown at Left: New 1939 Dodge 1½-Ton, 160" W. B. Stake..... $825.00 Dual Wheels Extra

(Transportation, State and local taxes, if any, extra.)

COMPARE PRICES!

You'll find Dodge, with all its extra quality, now priced with the lowest!

$465 ½-TON, 116" W. B. CHASSIS—delivered at Detroit, complete with spare tire and all standard equipment. Price includes Federal tax. Transportation, State and local taxes (if any), extra.

$590 1½-TON, 133" W. B. CHASSIS—delivered at Detroit, complete with all standard equipment. Price includes Federal taxes. Dual wheels, transportation, State and local taxes (if any), extra.

EASY BUDGET TERMS!

SEE YOUR DODGE DEALER

CONTRACTORS...TAKE A TEST! That's All Dodge Asks

NO matter what size or type of truck you need, try a Dodge! It is literally true that Dodge, with a giant new truck plant, has completely revised all old ideas of values in the lowest-price truck field.

Now for 1939, Dodge new methods, new high manufacturing efficiency, make possible "more truck for your money." In a five-minute comparison you can see how Dodge leads for 1939 in 5 vitally important ways.

Dodge gives you the new super-tough steel, "Amola," in vital parts.

Dodge gives you engine power to fit the job. 7 "truck-built" engines, with 11 definite special features to save fuel, oil and upkeep.

Dodge gives you Bonderized (rust-proofed) cabs, bodies and all sheet metal.

Dodge gives you *genuine* hydraulic brakes, fully equalized to save tires, re-lining and adjusting.

Dodge gives you really new streamlined styling—most advanced designing—bigger cabs—modern load distribution—a long list of advancements you can't find equalled anywhere else. Yet Dodge trucks are priced with the lowest.

So, before you buy any truck, go see a Dodge! Just take a test...that's all Dodge asks.

GIANT NEW DODGE TRUCK PLANT—To bring buyers a new high in truck values for 1939, Dodge spent millions on a giant new truck plant, especially engineered and equipped to build better trucks at lower prices. This explains why you can get so much more for your money in 1939 Dodge trucks.

Coolidge Bridge

(*Continued from preceding page*)

capacity and hauled to the abutment where it dumped in a stream to the hopper at the bottom of a 60-foot portable conveyor of the contractor's own design and equipped with a 30-inch belt. This belt raised the concrete to a 1-yard Insley hopper on the abutment from which four hand buggies were filled. An extra man was provided to help push the loaded buggies up the slight incline to the top of the forms. The concrete was placed with an I-R pneumatic vibrator.

Miscellaneous Items

The approach fills were made with selected borrow and were dumped by the hauling trucks and spread with a Caterpillar RD6 and LaPlant-Choate bulldozer.

In the contractor's yard where the forms were made, an American saw table was used, powered with a LeRoi engine and covered to protect the workers both from sun and rain.

A second Bucyrus-Erie steam crane was used on the job, supplementing the crane that stayed with the work at the pier on which the major operations were underway at any time. Both cranes carried white signs with bold black lettering reading "Dangerous—Keep Back." One of the cranes had a bell on a spring attached to the rear end so that it rang whenever the crane was swung.

Another safety item was the adequate floodlighting of the job at night. By taking advantage of the railway bridge running alongside the temporary trestle the contractor was able to spot a number of floodlights on the trusses, giving excellent light for night work.

At several points where machinery was concentrated on the job the following sign was displayed prominently:

Oiling Adjusting
Cleaning Repairing
Must Be Done
ONLY
When Machine
Is Shut Down

Personnel

FAP 193-B, the construction of the Hadley-Northampton highway bridge over the Connecticut River on Mass. Route 9 was awarded by contract to T. Stuart & Son Co. of Watertown, Mass., on its low bid of $1,193,230.95. The work was in general charge of Ray Stuart with H. F. Powell as Superintendent. For the Massachusetts Department of Public Works, A. G. Robertson was Resident Engineer. The bridge will be opened to traffic this month and final work will be completed in the spring.

Lubrication Fitting For Heavy Machinery

A new free-flow giant Alemite button head fitting, designed to speed up the lubrication of heavy machinery, has been announced by the Alemite Division, Stewart-Warner Corp., 1850 Diversey Parkway, Chicago, Ill. Bearings requiring large amounts of lubricant, such as those on tractor track rolls, can be lubricated in less time than with older types of fittings and with less chance of damage to grease gun equipment through overloading, according to the manufacturer.

In the new fitting, the usual valve core has been replaced with one which has a flat face and seat and which, when open, provides a free flow of the lubricant. By expanding the diameter of the valve retaining spring, the lubricant flows unobstructed through the center of the spring and not through its compressed coils. The improved valve opens easily under slight pressure, and provides an effective and tight seal against the loss of lubricant when the pressure is removed. The body of the new fitting is hardened to withstand rough treatment. Another new feature is the smooth top, to eliminate the cutting or wearing of the coupling sealing washer.

Complete information on the use of this new Alemite fitting, as well as on other Alemite lubricating equipment, may be secured by interested contractors and state and county highway engineers direct from the manufacturer.

New Bulletins Describe Cranes, Shovels, Hoists

The American line of 1½, 1¾ and 2-yard heavy-duty shovels, gasoline, diesel and electric hoists, and 40 and 50-ton locomotive cranes, made by the American Hoist & Derrick Co., St. Paul, Minn., is described and illustrated in a series of catalogs recently issued by that company.

Catalog 600-L-2 is devoted to Models 408 and 508 locomotive cranes; 700-G-11 describes and illustrates the fully convertible American Gopher heavy-duty shovel, crane and dragline units; and Bulletins No. 100-H-1 and 100-H-2 contain information on American hoists in all types and sizes, including the new general purpose gasoline, diesel or electric hoist. Copies of any or all of these catalogs may be secured direct from the manufacturer or from this magazine.

Is your job ever held up because of breakdowns? Keep your equipment up-to-date. Write for information.

THE AMERICAN DELUXE CONCRETE BARROWS

The First "All American" Barrow

Struck Capacities
No. 1 4 cu. ft.
No. 2 3½ cu. ft.
No. 3 3 cu. ft.

Seamless steel trays. Extra bottom plate. Any little man can do a big man's job with this Wheelbarrow because the load *is* over the wheel.

WRITE FOR CATALOG NO. 63

THE AMERICAN STEEL SCRAPER CO., SIDNEY, OHIO

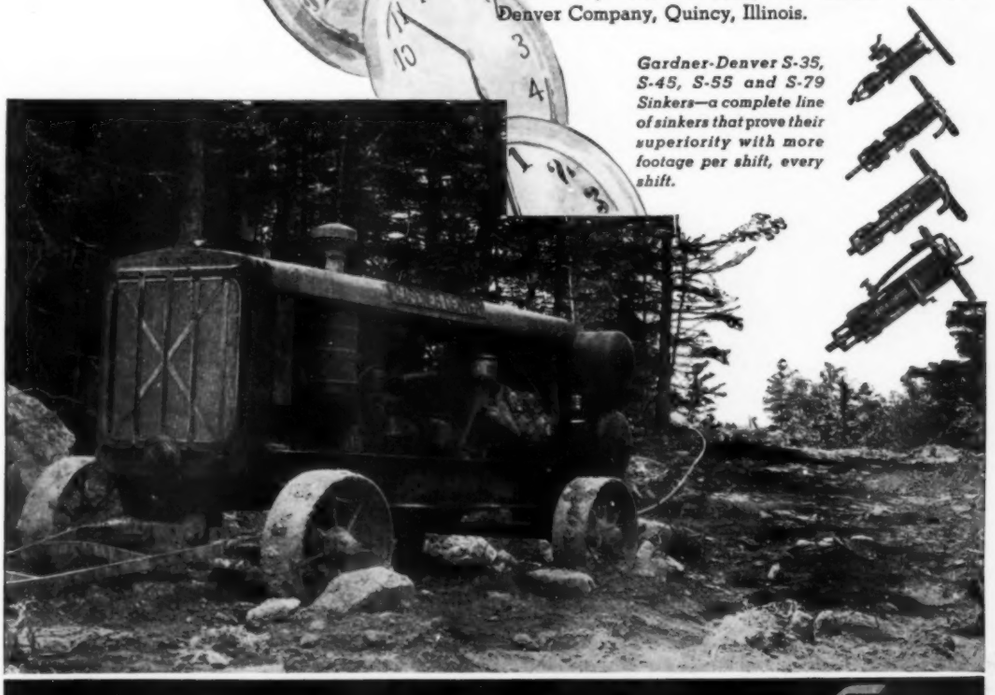
10,354 HOURS—6½ WEEKS—OF CONTINUOUS SERVICE—WITHOUT A FORCED SHUTDOWN!

DO YOUR "PORTABLES" PERFORM LIKE THIS?

● 24 hours a day—7 days a week—for 10,354 hours of continuous service! That's the record this Gardner-Denver Diesel Portable Compressor has established on a mountain highway job. Careful check-ups after the 10,354th hour showed no appreciable wear, although the compressor has never been shut down except for the weekly oil change.

Owing to the efficiency of the Gardner-Denver Compressor, coupled with the economy of the "Caterpillar" Diesel engine, fuel and lubricating oil costs have been remarkably low.

YOU can get dependable, economical service like this from your "Portables"—you can be free of interruptions and sure of steady profits on your job—by choosing Gardner-Denver Diesel Portable Air Compressors. All over the country, they are speeding job progress and lowering job costs. Let us tell you the whole story—write us today for bulletin. Gardner-Denver Company, Quincy, Illinois.



Gardner-Denver S-35, S-45, S-55 and S-79 Sinkers—a complete line of sinkers that prove their superiority with more footage per shift, every shift.

GARDNER-DENVER 80th ANNIVERSARY YEAR

The New Winslow Motor Truck Scale

Motor Truck Scale For Shallow Pits

Most state highway departments specify that all bulk materials used in road construction and maintenance be measured by weight, requiring a heavy capacity motor truck scale conveniently located on the job. The Winslow Government Standard Scale Works, Terre Haute, Ind., has designed a scale particularly adapted for road-building contractors, portable crushing plants and highway departments which eliminates costly foundations and can be installed quickly and is readily portable.

The Winslow Type P-S is a standard heavy-duty motor-truck scale of 15-tons weighing capacity with an 18-foot platform and accommodates the majority of trucks used in road construction and crushed rock industries. The design of the scale is such that the main lever stands which support the entire scale mechanism are permanently welded to a base plate at the two ends. This provides proper spacing for all the scale parts and eliminates faulty installation, since all the parts are in true alignment and cannot be set out of position. The frame is held rigid by latticed steel angles bolted to the end channels, which also serve as side walls to eliminate concrete construction. These can be quickly unbolted when the scale is to be moved.

The floor plate construction eliminates bulky timbers and reduces weight. It is built in sections of non-skid steel floor plates bolted to the steel weigh bridge. The flanged side guides the truck squarely on to the platform and distributes the load uniformly. These plates may be removed when the scale is being transported or may be left fastened to the steel weigh bridge, depending on the hauling equipment.

The over-all height is 15 inches, requiring a minimum of excavation for a scale pit or it may be set flush with the ground by ramping approaches at each end. Four small concrete piers, one at each corner, are recommended to provide solid foundation and assure correct weights. Complete details may be secured direct from the manufacturer, or through this magazine.

Heavy-Duty Machines For Earth Grading

Kay-Brunner Steel Products, Inc., 2721 Elm St., Los Angeles, Calif., manufactures a line of earth grading equipment including bulldozers, trailbuilders, rippers, carrying scrapers, bottomless scrapers, tamping rollers, land levelers and special cable and hydraulic control units for use with this equipment. A new series of descriptive illustrated literature on this equipment is available to readers of CONTRACTORS AND ENGINEERS MONTHLY writing direct to Kay-Brunner.

Bulletin DA831 describes the working of K-B Master hydraulic bulldozers, while supplementary Bulletins 200ED1 and 260ED contain information on the Type C and Type Y hydraulic bulldozers respectively. Bulletins 264ED and 265ED describe K-B Model B cable-controlled bulldozers for various sizes of Caterpillar tractors.

The K-B Master hydraulic trailbuilder is described in Bulletin DA-830, while supplementary Bulletins 263ED and 266ED describe the Model A cable-controlled trailbuilders. Form No. 268ED is devoted to the K-B hydraulic corner-control unit and Bulletin No. 267ED to the cable-power-control unit.

Master tamping rollers, single, double and triple-drum units, are described in Bulletin DA-834 with a supplementary Bulletin No. 113EDC on the fully oscillating type roller.

When it comes to heavy-duty rippers, full information on the K-B Master heavy-duty ripper is found in Bulletin DA-833, with supplementary information in Bulletin No. 269ED. These units are built with a heavily constructed electric cast steel tool head and a welded steel draft frame.

Earth can be moved quickly and cheaply in a bottomless scraper and the K-B Master bottomless scraper is described and illustrated fully in Bulletin DA832 and supplementary Bulletin No. 261ED. The K-B land leveler is described in Bulletin No. 132ED.

New Lighting Plant With Battery Charger

A new electrically started battery-charging light plant of 12-volt 300-watt capacity has recently been announced by Briggs & Stratton Corp., Milwaukee, Wis. Known as the Power-Charger Model 300, this new unit is suitable for furnishing current for lights on equipment and for night work on the job, as well as for battery charging.

In addition to charging all 12-volt storage batteries, Model 300 also charges all 6-volt storage batteries used in automobiles. The generator is a specially built high-efficiency unit, fan cooled, with full ball-bearing armature, large capacity brushes and equipped with ammeter. The generator is designed to prevent burning out of the armature if the battery becomes disconnected during charging. An automatic cut-out prevents the battery from discharging when hooked to the idle unit. The multiple-control switch has four positions for "start", "neutral", "high" and "low" charging output.

Power is furnished by a Briggs & Stratton Model IBP 4-cycle air-cooled motor, electrically cranked by the generator through a series winding. The motor speed is automatically controlled by an adjustable pneumatic governor. Standard equipment includes a patented high-tension built-in flywheel magneto, oil-bath type air cleaner, gasoline filter, float feed carburetor, ball-bearing drive shaft and screened blower housing.

"And what, my good man, is a ring gear thrust plate?"

IT'S NO WONDER the duchess doesn't understand. She doesn't drive a truck. But when we mention a ring gear thrust plate to you, we're talking a truck man's language. You recognize it as evidence of the care and study behind Ford rear axle design. And there's a lot more evidence of quality building in every Ford Truck —such features as the V-8 engine, straddle-mounted pinion, needle roller bearing universals, and a score of others. They all add up to quality—and that's the basis of Ford dependability, economy and long life.

CHECK YOUR TRUCK AGAINST THESE QUALITY FORD FEATURES!

V-8 ENGINES—95, 85, 60 HP.—Smooth, dependable, low-cost power. Quality materials and precision workmanship for efficient operation and long life.

SEMI-CENTRIFUGAL CLUTCHES—Non-tiring pedal action. Centrifugal force provides tremendous power-transmitting capacity. Up-keep costs kept at a minimum.

STURDY TROUBLE-FREE TRANSMISSIONS—Large roller and ball bearings for all forward speeds reduce friction, save power. Oil-hardened chromium-steel gears for long service.

FULL TORQUE-TUBE DRIVES—Springs relieved of driving and braking stresses provide better cushioning of truck and its load. Shackle-bolt wear reduced, spring life prolonged.

RUGGED REAR AXLES—All driving pinions are straddle-mounted to maintain gear-tooth alignment. All truck axles are full-floating, with weight carried on axle housing—none on axle shafts. These features increase dependability and long service, reduce up-keep expense.

BIG POWERFUL HYDRAULIC BRAKES—Equalized braking action for straight stops. Big brake-drum diameters and large lining areas for long brake life and low-cost maintenance.

• *In every detail, the quality of all Ford bodies matches the high quality of Ford chassis. Their exceptional durability means long service with low up-keep cost.*

FORD V·8 TRUCKS *and Commercial Cars*

Ford Motor Company, Builders of Ford V-8 and Mercury Cars, Ford Trucks, Commercial Cars, Station Wagons and Transit Buses

North Carolina Road Widened and Surfaced

(*Continued from page* 15)

inch while the surface course was laid to 1 inch uniform thickness. Both the leveling and the top courses were laid from the two ends of the job toward the plant, and the leveling course was laid with a 2¾-inch crown which was carried through the surfacing course.

The spreading of the two courses was done with a new Jaeger DX finisher which at the time was the only one in the east or south, there being several in the west. The batch trucks dumped the mix into the central hopper of the finisher. Then the operator moved it as required to the left or right with the two reversible screw feeders just ahead of the strike-off, behind which is the screed which moved transversely across the road, smoothing and compacting the material. The machine, powered with a Hercules engine, moved ahead on ¾ x 3-inch rails laid on the wooden forms and spiked to them to give a smoother riding surface for the machine and better bearing than the wood, and also to provide additional thickness of material for compaction by the rollers. One man was required on each side of the road to move the forms ahead constantly. This is readily apparent when it is remembered that the average speed of spreading the surface course was 450 linear feet per hour down the 20-foot road.

The crew working around the spreading operations consisted of the Jaeger finisher operator, two men with shovels and one wheelbarrow when running top to carry material back for spotting low places, one man raking where the screed missed the edges because of the extra rail when running top, one man straightedging and marking the surface with yellow circles for low spots and yellow blocks for high spots, and the three tandem-roller operators.

The surface was rolled with two Buffalo-Springfield 8-ton tandem steam-powered rollers and one gas roller of the same size and make. The rolls of the machines were wet with water run onto burlap swabs. The faster gas roller was used to roll a regular sine curve down the road on a 45-degree angle in what to the casual observer might have been considered "drunken driving." Careful watching showed that he lapped the rolls the same as the men rolling directly up and down the road.

The last operation on the road was the spreading of limestone dust on the surface by two men and then luting it to cover the entire surface for traffic to work into the top.

Personnel

This contract for the widening and resurfacing of 17.45 miles of U. S. 301 consisted of two Federal projects FAP 594 A and B, and was awarded to Blythe Bros. Construction Co. of Charlotte, N.C., on its low bid of $114,641.40 for widening, resurfacing and structures. E. W. Crowder was Superintendent for the contractor. W. E. Hawkins was Construction Engineer, L. E. Whitfield, Division Engineer, and R. P. Dowtin, Resident Engineer for the North Carolina Highway and Public Works Commission on this project.

The contractor had two large Rogers trailers for the quick moving of heavy equipment from one part of the job to another and also for the shifting of heavy machinery such as rollers and graders between jobs, using railroad transportation only for the heaviest and most bulky equipment.

GOOD USED EQUIPMENT
For Sale
Lorain shovels, cranes, draglines—from ¾ to 1½ cubic yards.
Jaeger concrete mixers.
Gardner-Denver air compressors, wagon drills, jackhammers.
Buckeye and Hug trucks.
Allis-Chalmers L, LO and WK tractors and crawler wagons.
Other miscellaneous equipment. Write to:
M. E. GILLIOZ, INC.
Broadway Hotel Bldg. Monett, Mo.

The Emsco Trailbuilder

Buckeye Handles Emsco Products in the East

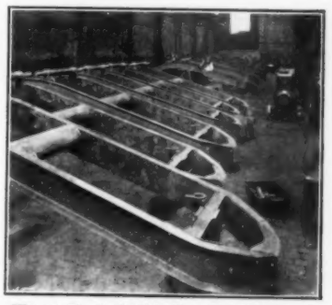
The Buckeye Traction Ditcher Co., Findlay, Ohio, and The Tractor Equipment Division of The Emsco Derrick & Equipment Co., Los Angeles, Calif., have effected an arrangement whereby Buckeye will in the future manufacture and sell Emsco tractor equipment in all territory in the United States and Canada east of the 100th meridian.

The Emsco line includes, in addition to the Emsco hydraulic controlled trailbuilder illustrated, cable-controlled trailbuilders, hydraulic and cable-controlled bulldozers, rippers and scrapers up to 12-yard capacity; sheepsfoot tamping rollers; and the Garner tractor shovel.

Sales and service for this equipment will be handled through the Buckeye organization in all territory roughly defined as lying east of Laredo, Texas; Dodge City, Kansas; Broken Bow, Nebraska; Gettysburg, South Dakota; and Rugby, North Dakota. All of Oklahoma except the three western Panhandle counties is included.

Welding Makes the Grade

The use of welding in the construction of Warco road graders not only results in more rigid equipment but cuts costs approximately 15 per cent and reduces the amount of maintenance required after the equipment is in service, according to a report from the W. A. Riddell Corp., Bucyrus, Ohio, manufacturer of road machinery.



Warco Road Grader Frames Being Arc-Welded by a G-E Type WD Welder

In the Riddell factory, General Electric arc welders are used in the production of Warco graders and the savings and advantages accruing from the use of welding as a fabrication tool are passed on to the customers.

SERVICISED PRODUCTS CORPORATION

The new rebuilt and enlarged Chicago factory of Servicised. Equipped with the most modern facilities to produce our complete line of Expansion Joints, Bridge Planking, Sewer Compounds, Flooring Products, etc.

EXPANSION JOINTS—

Premoulded Asphalt Joints .. This is the Standard Asphalt Joint containing a 70% asphalt content. Furnished with or without extrusion escape chambers.

Cork-Rubber Joint ..... A resilient non-oozing joint. After compression to 50% has recovery within one hour of 90—95%.

Plain Cork Joint ..... A resin-bound cork joint also having a recovery after compression of 90—95% with very limited extrusion.

Sponge Rubber Joint ..... Furnished with or without felt sides compressed to 50%. Recovery 90—95%.

Fibre Joint ..... Contains 35% asphalt. Compressed to 50% thickness. The extrusion practically nil. Recovery one hour 70—75%.

THE above types of joint illustrate SERVICISED service to engineers and contractors in providing both the controlled oozing and non-oozing types of expansion joint. The specifications of the various types are shown under each type and are the minimum and not the maximum tests.

Our types of non-oozing joints will not warp or shrink in the hot sun or hot weather, eliminating the necessity of wetting down before using.

The oozing types of joint are controlled by escape accessories making provision for the surplus flow under pressure. We also furnish engineers extruded joints for the reception of metal fittings and specialize on extruded products for engineers in State, Municipal, Railroad and Civil work.

SERVICISED service and performance have never been questioned and the same quality is being maintained as heretofore.

Other Products:

ASPHALT PLANK

for Bridge Decks
" Protection Course
" Industrial Flooring
" Roof Decks

SEWER COMPOUNDS

Hot Pouring
Tufflex
Servitite
Premoulded Belts
2 in 1 Die-Cast

Also a complete line of Flooring Products such as Rubber Tile, Cork-Rubber-Tile and featuring "Rubberlok" the Tongue and Groove Rubber Tile

SERVICISED QUALITY PRODUCTS © 1939

SERVICISED PRODUCTS CORP. • 6051 W. 65th ST. • CHICAGO

Highway Depot At Craig, Colo.

Well-Planned Building And Complete Repair Shop Increase Efficiency and Reduce Costs

By F. M. DRESCHER, Assistant Superintendent of Maintenance, Colorado State Highway Department

✦ CURIOSITY may prompt someone to read this article, to find out what or why is Craig. We who live here have often wondered ourselves. The local paper will tell you that it is the metropolis of this Rocky Mountain Empire, but actually it is that wide place in the road in northwestern Colorado at the intersection of U. S. 40 and Colorado 13. In Craig are located the office, shops and supply point for Maintenance Division 6 of the Colorado State Highway Department. The headquarters of the Colorado State Highway Department is in Denver, with Charles D. Vail as Highway Engineer and D. N. Stewart, Superintendent of Maintenance.

Maintenance in Colorado is handled under the patrol system, with seven division offices, each with an Assistant Superintendent of Maintenance in charge. Each division is divided into patrols, with both personnel and equipment handled from these division offices. In addition to the patrols, there are extra crews for oiling, snow removal, etc.

Division 6 covers all of northwestern Colorado and handles the regular maintenance of U. S. 40 from the Utah-Colorado line to Fraser, at the foot of Berthoud Pass (exclusive of 22 miles of Rabbit Ears Pass, maintained by the Bureau of Public Roads); Colorado No. 13 from the Wyoming-Colorado line to Rifle, junction with U. S. 24; Colorado No. 11 from Kremmling on U. S. 40 to Wolcott, junction with U. S. 24; and Colorado No. 16 from Granby on U. S. 40 to Grand Lake,—approximately 400 miles divided into 19 patrols. The patrol lengths vary from 15 to 25 miles, based on traffic count and physical difficulties, such as snowfall, canyons, etc. The division is all mountainous with altitudes ranging from 5,200 to 10,000 feet.

Division Equipment

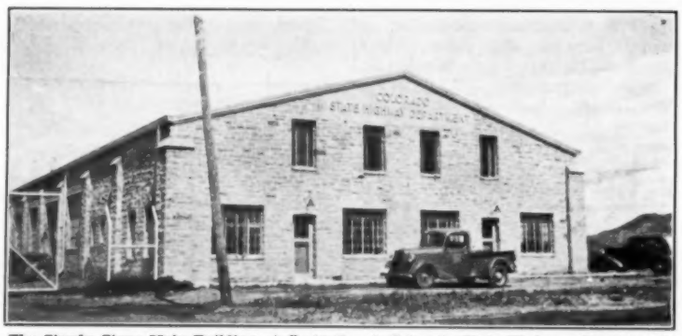
In general, each patrol is equipped with a 3½-4-ton truck, with either blade or V snow plow; an 8-foot leaning-wheel grader; grease guns and some small tools; and picks, shovels, slips, or fresnos. There are regularly two men on each patrol, a patrolman and helper. In addition to the regular patrol equipment, there is available and working out from the division depot such equipment as power shovels, extra snow removal equipment, extra trucks, ditching machines, etc.

The division equipment consists of two 5-ton trucks with snow plows, seventeen 3½-ton trucks with snow plows, twelve 1½-ton trucks, one ½-ton service truck, two ¾-yard shovels, two ditching machines, three rotary fresnos, six crawler tractors, nineteen leaning-wheel graders, two maintainers, three rotary snow plows, drags, slips, fresnos, tar pots, etc.

New Highway Depot

A new maintenance depot was built in Craig in the fall of 1937. The building is of native stone and steel construction, is 61 feet x 165 feet in plan. All walls are 16-inch, with pier reinforcement, and the vertical clearance of doors and beams is 13 feet. The roof is insulated with 1-inch Celotex on account of the climate.

In the front of the building are the offices of the Maintenance Department and also offices for the resident engineer. Above the offices are two storage rooms and a room for the janitor and watchman. This janitor's room overlooks the main shop and storage garage, a room 60 x 140 feet. Just back of the offices on the south side of the main building are the toilets and shower. On the other side is the stock room, where a complete supply of nuts, bolts, ignition parts, spark plugs, fan belts, picks, shovels, etc., is kept at all times. There is a stock room attendant always on the job to check out and charge to the proper unit and patrol each item that goes out, and to receive and check in supplies. A perpetual inventory is kept of all supplies and material.



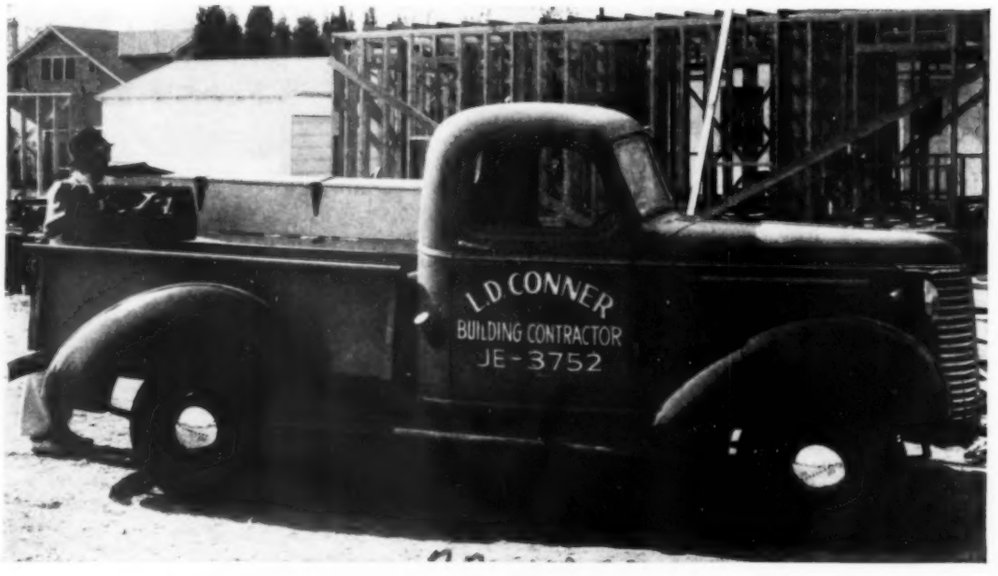
The Sturdy Stone Main Building at Craig Depot, Colorado State Highway Department

Just back of the stock room is the oil room, with a capacity of 15 barrels, which are set in racks. The floor of the oil room is 4 feet above the main floor and has an outside dock for loading and unloading barrels from trucks. All grease and oil barrels in use are kept in this oil room. The room is screened with No. 9 link chain wire so that the inside is visible at all times. All floors are concrete. All oil, grease and gas are checked out and charged to units and patrols.

The building is serviced by electricity, gas, city water and is connected to the city sewer. The heating plant is under part of the building but has no direct opening to the building. Entrance is from the outside and the entire furnace and coal rooms are covered with an 8-inch reinforced concrete slab. Coal is used and is fed to the boiler by an automatic stoker. Steam lines run to radiators in the offices and to unit wall blowers in the main shop. The coal bin has

(Concluded on page 46)

DESIGNED FOR THE LOAD
POWERED FOR THE PULL



CHEVROLET TRUCKS FOR 1939
Are Fitted to *Your* Needs

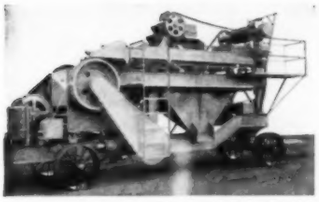
For hauling jobs ranging all the way from fleet delivery service up to heavy duty operation, there is a 1939 Chevrolet truck designed to fulfill your requirements. Let your nearest Chevrolet dealer show you the wide variety and versatility of the Chevrolet 1939 line of 45 models in eight wheelbase lengths—from Light Delivery units up to Heavy Duty models of 14,000 pounds gross-weight rating.

GREATER VALUE AT LOWER PRICES

For 1939, Chevrolet—the world's largest builder of motor trucks—presents the most complete and most capable line of trucks in Chevrolet history. Now there is a model fitted to your particular needs. Now *you* may enjoy the benefits of Chevrolet's famed economy, durability and efficiency—at new lower prices. Find out now why, during the last six years, business and industry have purchased more Chevrolets than any other make of truck in the world.

CHEVROLET MOTOR DIVISION, *General Motors Sales Corporation*, DETROIT, MICHIGAN
General Motors Instalment Plan—convenient, economical monthly payments. A General Motors Value

MASSIVE NEW SUPREMLINE TRUCK STYLING . . . COUPE-TYPE CABS . . . VASTLY IMPROVED VISIBILITY • FAMOUS VALVE-IN-HEAD TRUCK ENGINE • POWERFUL HYDRAULIC TRUCK BRAKES (Vacuum-Power Brake Equipment optional on Heavy Duty models at additional cost) • FULL-FLOATING REAR AXLE on Heavy Duty models only (2-Speed Axle optional on Heavy Duty models at additional cost)



The New Eagle Portable Straight-Line Gravel Plant

New Straight-Line Stone, Gravel Plant

A closed-circuit straight-line portable plant for gravel, stone or slag, for use where readily portable plants of large capacity are required, has recently been announced by the Eagle Crusher Co., Inc., Galion, Ohio. These plants are available in different sizes up to and including 10-36 crushers. The unit is mounted on a heavy-duty four-wheel steel truck obtainable with steel or pneumatic-tired wheels, furnished with or without power.

The crushers are of modern design, with one-piece electric-welded steel plate frames and anti-friction bearings and operate in closed circuit with the elevator and vibrating screen. A cross belt conveyor is used for delivery of the crushed material to the bucket elevator. The unit is provided with a steel platform and railing, permitting easy and safe access to the feed conveyor control and screen while the plant is in operation. For crushing open-hearth or blast-furnace slag, these plants may be equipped with an electric generator and magnetic separator for removing the metal from the slag.

A 4-page illustrated bulletin, containing complete specifications of these Eagle portable gravel and quarry plants may be secured direct from the manufacturer by mentioning this item, or from this magazine.

New Diaphragm Pump

Although the diaphragm pump, which is one of the oldest types used in construction, has been more or less pushed aside by the newer self-priming centrifugal, it still has a definite place in the industry as there are types of jobs which only a diaphragm can handle, according to the Novo Engine Co., 216 Porter St., Lansing, Mich., which has recently announced a new light-weight diaphragm pump.

This new 3-inch pump has completely enclosed gearing and a double braced eccentric which transmits the power to the pump, replacing the old cumbersome walking beam. Power is furnished by a 2½-hp air-cooled anti-friction engine close coupled to the pump. Particular attention has been paid to accessibility and the removal of four brass nuts permits inspection of both the suction and discharge valves. Two additional nuts remove the diaphragm. The unit has a rating of 3,000 gph at 10-foot suction and 1,500 gph at 20-foot suction.

Bulletin No. 118 describing this new Novo pump, which can be mounted on a skid, or a two-wheel steel or pneumatic-tired truck, may be secured direct from the manufacturer.

The Novo 3-Inch Diaphragm Pump

Welding and Cutting Apparatus and Supplies

Two new catalogs on its line of welding and cutting apparatus and supplies have recently been issued by the Air Reduction Sales Co., 60 E. 42nd St., New York City. Catalog 21 is designed to assist the large user of oxy-acetylene and electric welding equipment and contains 64 pages covering the complete Airco line and containing valuable information on the safe use of this type of equipment.

Catalog 22, containing 32 pages, depicts hand welding and cutting torches and tips, pressure regulators, fluxes, rods and other supplies, as well as containing valuable information on portable oxygen and acetylene manifolds, circular cutting attachments, cylinder trucks, torch extensions and other items.

Copies of either of these catalogs may be secured by interested contractors and state and county highway departments direct from the manufacturer or from this magazine.

STERLING BALANCED WHEELBARROWS

GREATER PART OF LOAD BALANCED OVER WHEEL. LESS THAN 20% ON ARMS.

NO. S-12—FOR DRY MATERIALS

NO. S-18—FOR CONCRETE

A COMPLETE LINE OF STERLING WHEELBARROWS AND CONCRETE CARTS.

STERLING WHEELBARROW CO., MILWAUKEE, WIS.

KOEHRING TRAIL-DUMP

EASY LOADING

—Low, wide body of the Koehring Trail-dump allows quick and easy loading, from a shovel dipper, dragline bucket or elevating grader. Three point suspension and free motion of swiveling hitch yoke permits travel through ditches, over furrows and up and down steep dump grades, with full traction of all wheels.

KOEHRING HEAVY DUTY

KOEHRING COMPANY

Pavers · Mixers · Shovels · Cranes · Draglines · Dumptors · Mud-Jacks

3026 WEST CONCORDIA AVENUE, MILWAUKEE, WISCONSIN

The New Barco J-2 Driller on a Quarry Job, with the Drill-Hole Blowing Equipment Also in Use

New Self-Powered Portable Driller

After many tests on actual drilling operations conducted on all types of jobs and under a wide variety of working conditions, the Barco Mfg. Co., 1801-15 Winnemac Ave., Chicago, Ill., has announced full-time production of its newly designed self-powered portable driller known as the Barco J-2. In contrast to previous Barco models, which consisted of a drilling swivel applied as an accessory tool to the Barco hammer, the J-2 is designed as a driller, incorporating the drill-turning mechanism directly in the base of the power unit.

This gasoline-powered drill is light in weight, so that the operator can easily carry it to the site of the drilling operation. A ratchet wrench for turning the drill rod is standard equipment and, if the user desires to eliminate hand spooning or flushing of the hole, a small portable air compressor unit, necessary storage tank and fittings are available.

Literature describing the new Barco J-2 is now available by writing direct to the manufacturer and mentioning this magazine.

Japan Sees Necessity For Road Improvement

According to a recent report from the U. S. Bureau of Foreign and Domestic Commerce, the Japanese Home Office will request 3,000,000 yen for road improvements in the budget for the 1939-1940 fiscal year, on the theory that more than this amount will ultimately be saved as a result of paving 36 more miles of national highway and 192 miles of prefectural roads. What the Japanese choose to refer to as the "China incident" is said to have been responsible for a definite increase in the rural truck traffic which handles much of the marketing of crops.

The authorities concerned state that savings will be effected in gasoline consumption, automobile depreciation and cost of road maintenance. According to one report, it has been estimated that the average life of a truck on a paved road is 6 years as compared with 3 years on dirt and gravel roads. At the present time, only about 12 per cent of the Japanese national highways and 2 per cent of the prefectural roads are paved.

Rock, Earth and Muck Met on Vermont Grade

(*Continued from page 2*)

feet. Just beyond this second rock cut was another in which a Gardner-Denver 310-foot compressor was working with an Ingersoll-Rand wagon drill.

Working the Earth

An Allis-Chalmers Model ML tractor with an 8-yard Carryall scraper was used on the earth cuts, running on hauls up to 1,000 feet. A T-40 TracTracTor with a Bucyrus-Erie bulldozer was used around the Carryall and on the earth fill. A 6-wheel Caterpillar Auto Patrol was also used in finishing the fills to grade.

A Bucyrus-Erie 20B was the utility shovel and crane on the job, handling every type of work to which such a machine could be put. It was used for setting the reinforced concrete culvert pipe and with a crane boom and ¾-yard clamshell did a lot of the structure excavation where it could not get in for work as a shovel. With a backhoe it was also used for trench excavation and again with the crane boom it did the pile driving for the small bridges, handled the sheeting and removed the muck toward the south end of the job where the line ran for some 400 feet through a muck deposit. This was excavated and backfilled with gravel. The material was dumped by the trucks at the edge of the fill and pushed over by a Caterpillar Fifty diesel with a LaPlant-Choate hydraulic bulldozer.

Bridges

The bridges were all small but nevertheless important enough to the contractor to move in a bridge superintendent, E. Rex Murphy, who had been working on a large bridge at Plymouth, N.H. During the time the steel superstructure was being erected on the Plymouth job he moved over to Underhill and cleaned up the small bridges on this contract and then returned to Plymouth to put on the concrete decks and paving.

The bridges consisted of a 7 x 7-foot reinforced concrete box, another 8 x 3-foot 7-inch box built on a skew and an 8 x 8-foot box.

Producing Stone for Surface

About ½ mile south of the end of the project the contractor set up a complete crushing, screening and washing plant for the production of the stone for the mixed-in-place road surface. River gravel was used, loaded from the stream bed by a Unit 310 Universal ⅜-yard shovel to four shuttle trucks which hauled the material to a ramp up which they backed and dumped into the feeder hopper of the 10 x 26-inch Acme jaw crusher driven by a LeRoi engine. A complete Good Roads screening and washing plant driven by a Waukesha motor produced the proper sizes of crushed gravel and sand. The crushed material was moved from the crusher to the screening plant by a 90-foot belt 36 inches wide. The sand washer was located beside and just below the screening plant.

The 2½-inch road-mix surface was built up with a drag mixer pulled at a uniform speed over the traveled way.

Major Quantities

The major quantities involved in this contract were:

ROADWAY

Solid rock excavation	8,700 cubic yards
Common excavation, including borrow	96,000 cubic yards
Trench excavation, earth	4,100 cubic yards
Trench excavation, rock	1,000 cubic yards
Channel excavation	129 cubic yards
Structure excavation	300 cubic yards
Subbase of gravel	45,300 cubic yards
Crushed-gravel M.I.P. surface course with refined tar	4,200 cubic yards
Refined tar	92,535 gallons
Concrete, Class A	370 cubic yards
Reinforcing steel	37,700 pounds
12-inch reinforced concrete pipe	468 feet
18-inch reinforced concrete pipe	952 feet
24-inch reinforced concrete pipe	100 feet
30-inch reinforced concrete pipe	124 feet
15-inch corrugated galvanized-iron asphalt-coated pipe	70 feet
18-inch "	1,190 feet
24-inch "	188 feet
30-inch "	64 feet
36-inch "	102 feet
Cable guard rail	12,028 feet

BRIDGE

Channel excavation	269 cubic yards
Structure excavation	195 cubic yards
Class A concrete	294 cubic yards
Reinforcing steel	39,306 pounds

Personnel

The contract for the construction of FAP 98-H, consisting of 5.08 miles of grading and mixed-in-place surfacing with the required small bridges, was awarded to the Lane Construction Corp. of Meriden, Conn., on its low bid of $132,441.67. The work was carried on under the direction of F. L. Bowen as Superintendent for the contractor and Reginald Arnold was Resident Engineer for the Vermont Department of Highways.

"Highways of Tomorrow" will be the theme of the ARBA Convention and Highway Exhibit to be held in San Francisco March 7-10, 1939. Don't Miss It!

30 Years of Contracting Experience Designed this Machine—

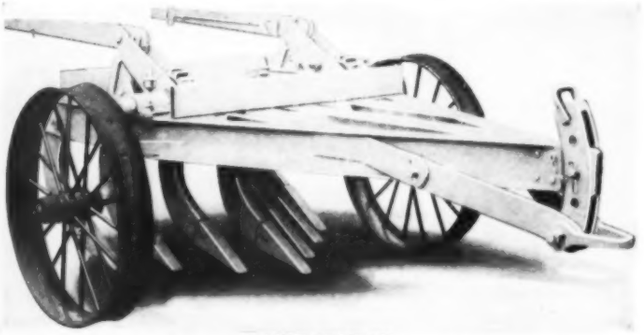
The K & J ROAD RIPPER

—and the resulting strength, ease of operation, and quick "transportability" mean money saved in the grading, reshaping and ripping of old and new roads alike.

Operation for depth of cut is by means of two levers and, as axle is in two parts, either side can be raised and lowered independent of the other side, thus allowing for either uniform depth of cut from nothing to 21", or from nothing on one side and 21" on the other side—with the wheels running on level ground.

The *Tractor Hitch* is adjustable to keep frame level at different depths of teeth for uniform ripping.

Either 2, 3, 4, 5, or all 7 of the removable teeth can be used according to specific road conditions.



A General Purpose Machine Designed For Both Heavy and Light Work

Write for descriptive literature—Also manufacturers of concrete carts and wheelbarrows

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THE CASE CRANE & KILBOURNE JACOBS COMPANY

COLUMBUS, OHIO, U.S.A.

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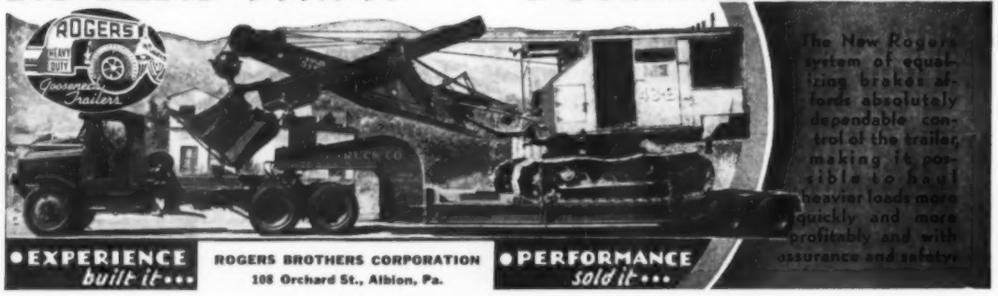

The New Rogers system of equalizing brakes affords absolutely dependable control of the trailer, making it possible to haul heavier loads more quickly and more profitably and with assurance and safety.

•EXPERIENCE built it•••

ROGERS BROTHERS CORPORATION
108 Orchard St., Albion, Pa.

•PERFORMANCE sold it•••

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FROM $6 WITH MEALS & BATH
$3 ROOM ONLY & BATH Per Person 2 in a Room

Here you will find everything to further your comfort and enjoyment—outside ocean-view rooms . . . sun deck . . . beautiful dining room at the ocean's edge . . . superb cuisine . . . varied sports . . . and entertainment. You'll like your fellow guests . . . and the delightfully friendly atmosphere of The Chelsea.

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Road Funds for Roads!

With forty-seven states now completing surveys upon which they will base their future highway programs, major farm, industrial and business groups, and other leading users of the highways as well as organizations in the automotive-highway field, acting through the National Highway Users Conference, have joined together to urge that state legislatures soon to convene be guided by policies assuring that the more than a billion and half dollars paid annually by highway users in special taxes and fees be used only for highways to provide roads "suitable for the movement of modern traffic with safety, economy and facility."

1939-40 Highway Funds

Announcement has been made by the Secretary of Agriculture of the apportionment of $135,000,000 to aid the states in highway improvement and elimination of grade crossings in the fiscal year beginning next July 1. These funds, which were authorized by the Federal-Aid Highway Act of 1938, consist of $100,000,000 for improvement of the Federal-Aid highway system, including extensions through cities, $15,000,000 for secondary or feeder roads, and $20,000,000 for elimination of hazards at railroad grade crossings. The highway funds are to be matched by the states, increasing the sum for highways by $112,125,000, but those for grade crossings are available without matching. In addition, there will be the sums spent on state roads, county-aid roads and state highway maintenance from state funds.

The apportionment of Federal funds is as follows:

State	Regular Federal Aid	Secondary or Feeder Roads	Grade Crossings	Total
Ala.	$ 2,068,493	$ 310,274	$ 393,552	$ 2,772,319
Ariz.	1,423,400	213,510	125,461	1,762,371
Ark.	1,702,583	255,387	343,731	2,301,701
Calif.	3,793,823	569,073	728,856	5,091,752
Colo.	1,807,919	271,188	251,215	2,330,322
Conn.	624,021	93,603	167,075	884,699
Dela.	487,500	73,125	97,500	658,125
Fla.	1,335,020	200,253	277,471	1,812,744
Ga.	2,507,151	376,073	477,283	3,360,507
Idaho	1,223,119	183,468	141,779	1,548,366
Ill.	4,043,313	606,497	1,030,486	5,680,296
Ind.	2,425,913	363,887	506,736	3,296,536
Iowa	2,542,385	381,358	545,468	3,469,211
Kans.	2,585,837	387,876	504,959	3,478,672
Ky.	1,824,345	273,652	356,946	2,454,943
La.	1,436,747	215,512	310,856	1,963,115
Maine	873,495	131,018	135,191	1,139,644
Md.	821,349	123,205	200,663	1,145,237
Mass.	1,375,489	206,323	408,286	1,990,098
Mich.	3,012,993	451,949	649,147	4,114,089
Minn.	2,704,164	405,625	524,721	3,634,510
Miss.	1,746,261	261,939	310,650	2,318,850
Mo.	2,986,426	447,964	596,184	4,030,574
Mont.	2,032,384	304,858	261,252	2,598,494
Nebr.	2,044,283	306,642	347,689	2,698,614
Nev.	1,275,938	191,391	97,500	1,564,829
N. H.	487,500	73,125	97,500	658,125
N. J.	1,321,346	198,205	389,614	1,909,185
N. M.	1,595,294	239,294	166,957	2,001,545
N. Y.	4,845,924	726,889	1,335,949	6,908,762
N. Car.	2,321,357	348,204	500,977	3,170,538
N. Dak.	1,532,167	229,825	309,164	2,071,156
Ohio	3,583,189	537,478	833,853	4,954,520
Okla.	2,317,258	347,589	455,041	3,119,888
Ore.	1,638,823	245,823	224,953	2,109,599
Penn.	4,221,088	633,163	1,128,616	5,982,867
R. I.	487,500	73,125	97,500	658,125
S. Car.	1,328,214	199,232	293,750	1,821,196
S. Dak.	1,610,762	241,614	268,815	2,121,191
Tenn.	2,079,803	311,970	373,187	2,764,960
Texas	6,227,084	934,063	1,088,862	8,250,009
Utah	1,124,731	168,710	129,236	1,422,677
Vt.	487,500	73,125	97,500	658,125
Va.	1,815,401	272,310	373,906	2,461,617
Wash.	1,563,815	234,572	300,063	2,098,450
W. Va.	1,082,034	162,305	260,716	1,505,055
Wis.	2,413,315	361,997	486,074	3,261,386
Wyo.	1,249,044	187,357	132,134	1,568,535
D. C.	487,500	73,125	97,500	658,125
Hawaii	487,500	73,125	97,500	658,125
P. R.	487,500	73,125	150,076	710,701
Total	$97,500,000	$14,625,000	$19,500,000	$131,625,000

An additional sum of $3,375,000, bringing the total to $135,000,000, is set aside for administration and engineering reserve, of which $2,500,000 is for regular Federal-Aid roads, $375,000 for secondary or feeder roads, and $500,000 for grade crossings.

Long Super-Highway Planned by Czechs

The most significant reconstruction measure which the new Czechoslovak Government has announced is the intention to build a 625-mile automobile highway clear through the country in a west to east direction. It is believed that this construction project will create work for more people than any other single piece of construction possibly could. Unemployment is the principal problem with which the country is confronted, as a result of the loss of a substantial part of its territory to Germany, Poland, and in all probability, to Hungary. This project, in conjunction with new laws to free motor vehicles from taxation, is expected to give an unprecedented impetus to the automobile industry within Czechoslovakia.

The construction of the highway will take about five years, preliminary work having been started in November, 1938. It is planned to put about 50,000 men to work in the beginning and to increase this number gradually until 100,000 men are employed. Nearly three times this number will be employed in the industries which will deliver the materials for the project.

The highway will be a four-way thoroughfare along the same lines as the autostradas in Italy and Germany, with no intersections, few curves, and no railroad crossings. It will be bridged by connecting highways running from north to south. When completed it will afford access to every section of the country and quick transportation to districts in Slovakia and Ruthenia, some of which cannot now be reached in less than fourteen hours by fast train. It will also connect with the main traffic arteries in neighboring countries.

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For "Caterpillar"—International—Allis-Chalmers Tractors

Light but STRONG
Moderately priced
Hundreds in use
Economical to operate
because they are
EASY on TRACTOR
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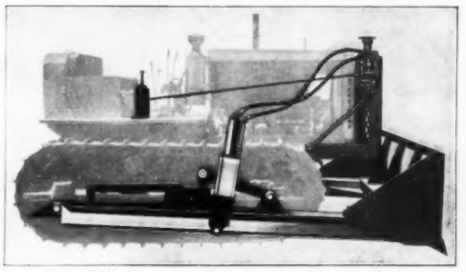

WM. BROS BOILER & MFG. CO. Minneapolis, Minnesota

Sorry, Jim, But Your Bid Was Too High!

It may strain old ties when you lose a job on price. But cost is still uppermost to the man who pays the bills—and that applies emphatically to excavating jobs.

If you still operate old type shovels, you'll find it increasingly difficult to compete with the new P&H excavators built of alloy steels. It's far wiser to work with them than to let them work against you.

Like hundreds of other owners, you, too, can cut your excavating costs with a P&H—five years ahead of the field. Harnischfeger Corp., 4419 W. National Ave., Milwaukee, Wis.

P&H PACEMAKERS · *Save money on the job.*

17 DIFFERENT MODELS P&H From ⅜ to 5 cu. yds. capacity. Gas, Diesel or electric power. Write for literature on the size and type that interests you.

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EXCAVATORS • ELECTRIC CRANES • ARC WELDERS P&H HOISTS • WELDING ELECTRODES • MOTORS

C. & E. M. Photo
The Big Koehring Dual Drum Paver That Set the Pace for the Concrete Crew

No Haste or Waste Time On 10-Mile Concrete Job

(*Continued from page 2*)

these men was also responsible for the oiling of the forms and one other man did nothing but keep the subgrade well sprinkled during dry weather. Where soft spots or low spots had to be brought up, the subgrade was compacted with a 5-ton Wehr roller.

The contractor had the advantage of paving over his own grade which always makes for better work and more care in the preparation of the rough grade. The grade was 12 inches of selected sand-clay bonded to the original subgrade by cutting and mixing with a Lakewood scarifier and a Dukelow plow, respectively.

In order to avoid the delays attendant upon pouring the reinforced approach slabs to the bridges when he came to them with the paver, the contractor poured them in advance for all eleven bridges on the job. These bridges ranged from 60 to 250 feet in length. All approach slabs had mud-pump nipples cast into the slab.

The Steel Crew

Rolling down the road at 1,800 feet a day means that the steel setting has to be handled in a carefully planned manner so that the paver is not held up by a delay in getting the steel into place or by tardiness in getting the steel ready for placing. Two men assembled the steel for the contraction and expansion joints at the batching plant where they were free to make the most of their time without the distraction of working on the shoulder under conditions not conducive to speed, as is usually done on most such jobs. The dowels were painted red and then oiled just before being taken out onto the road. They consisted of 16 dowels ½-inch round and 24 inches long assembled on ½-inch transverse deformed bars with feet welded onto the transverse bars for support at the proper height. The alternate ends of the dowels were capped for the expansion joints and no caps were placed for the contraction joint steel.

Four men placed the Laclede center steel with tie bars of ½-inch deformed bars 4 feet long spaced every 5 feet, threaded through the center steel and pinned to hold them horizontal. Two men from the shoulder carried in the reinforcing mesh and placed it on the concrete as struck off. These fabric mats were pinned in place at the corners and where lapped. The expansion joints were spaced every 90 feet and carried 1-inch headers of steel, previously oiled, and which were removed by the finishers for the pouring of the expansion joints.

The Work of the Big Paver

A necessary adjunct of any paver is the humble pump that supplies water to the pipe line along the shoulder. On this job three C. H. & E. triplex pumps were used, delivering water to the 2½-inch line which had the paver hose valves set every 200 feet. The paver carried 125 feet of hose.

As an example of the work of the concreting crew we record two days' runs, not records but they do show the regular day by day work of the organization. On one day when it was necessary to cross two bridges, and contractors do not cross them until they come to them, the concrete slab stretched out to 1,067 feet, while on another day, which was repeated regularly, the slab put down in 10 hours measured 1,857 feet.

The batches were fed to the Koehring 34-E paver at slightly less than two a minute by one man and then received 42½ seconds mixing in each of the drums before being delivered to the prepared subgrade. The paver carried a 35-foot boom and pushed a Carr Push Plane and pulled a Carr subgrade planer. One man on either side shoveled out the excess dirt from the subgrade planer, assisted by an extra man on one side who also looked after the paver hose to see that it did not get caught in the mats lying along the shoulder. The paver hose was attached to a boom on the right side fixed to the push planer. These same men removed the triangle of dirt against the forms behind the subgrade planer and also checked the final subgrade for elevation and section with a scratch template.

The contractor intended to start the job with a Koehring 27-E and one was delivered to the work in January, 1938, but the 34-E arrived in time to be put into operation when concreting actually started on March 26.

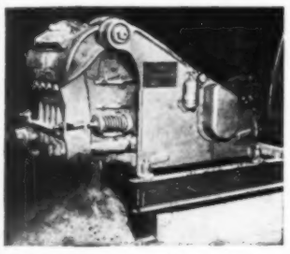
The big paver pulled a strike-off which cut the concrete 2 inches below the tops of the forms for the placing of the reinforcing mats. When the strike-off reached an expansion joint it would have struck the header so wooden frogs were held tightly on the forms at the joints so that the strike-off jumped over the header. Another innovation was the carrying of the paver tool box on the Push Planer on the side opposite to the hose. When it came time to shift hose the foreman gave a warning shout and all the men available around the paver dropped their work and grabbed the nearest section of the hose. Eleven men were used to make the shift and not a batch was lost. The paver carried a 250-gallon tank serving as an additional margin of safety against the loss of a batch.

Finishing

The one question we have heard from men on jobs where there was no dual-

(*Concluded on next page*)

KUE-KEN BALANCED CRUSHER



Make a really portable crushing plant with a KUE-KEN crusher. It is in perfect balance eliminating the need of foundations. May be mounted on trucks, trailers or tall bins, etc. Illustrating crusher under full load not even bolted to floor.

FOR LOW COST CRUSHING OF LARGE ROCKS VERY FINE IN A SINGLE PASS

KUE-KEN, with new crushing principle, crushes 2 to 5 times more than ordinary crushers of equal size and weight. Balanced pendulum type jaws with tremendous reduction ratio eliminate secondary crushers, etc. Less wear and lower costs because only a KUE-KEN crushes without abrasion — no rubbing. Balanced mechanism runs in sealed and filtered oil bath for long life and lowest upkeep.

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HEIL Quality PRODUCTS
HOISTS - BODIES - TANKS
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MOVE DIRT the HEIL DIG-N-CARRY WAY!

On job after job where scraper performance is judged by hard-boiled competitive standards, Heil Dig-N-Carry scrapers have "come through" with flying colors—Efficient Heil hydraulic system insures fast, positive action and split-second control of every operation—Investigate ALL of the advantages of Heil Dig-N-Carry scrapers before you buy—Address:

MILWAUKEE, WISCONSIN **THE HEIL CO.** HILLSIDE, NEW JERSEY

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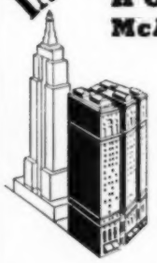

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HOTEL McALPIN
BROADWAY AT 34th ST., NEW YORK
Under KNOTT Mgt. John J. Woellle, Mgr.

Dual Drum Paver Used On Miss. Concrete Job

(*Continued from preceding page*)

drum paver and it was rumored that "the boss" was considering buying one was whether the finishing crew could keep up with the dual-drum paver. Also there has seemed to be some doubt as to whether the steel men could get the steel in and themselves out of the way so as not to delay the paver. This Ziegler job is an excellent answer to all these doubts for no one was in anybody's way and the work went on as smoothly as any 27-E paver job we have ever seen. Finishing was right on top of the paving at all times.

There were four puddlers, two at the power strike-off and two at the front screed of the Blaw-Knox Ord double-screed finishing machine. The T-iron for cutting the contraction joints was carried on the back of the finishing machine and the machine operator and one of the two men spading the sides against the forms used it at 30-foot intervals except at the expansion joints. Immediately behind, a man on a bridge inserted the Elastite preformed strip measuring 2 x ¼ inches in a cap and placed it in the slot.

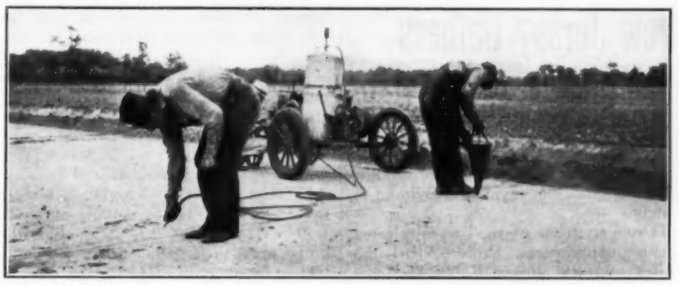
The next operation was the Koehring longitudinal finisher which was operated so as to carry the light grout from the surface to the edge and waste it beyond the forms. Dirt had previously been placed on the forms to protect them from this grout and so right behind the longitudinal finisher two men cleaned the dirt and concrete from the forms so they were ready to be pulled the next day. This operation also left the edge reasonably clean for the hand finishers as they came along immediately after.

Two hand finishers pulled Heltzel drag straight-edges, then used a 6-inch belt, herringbone style, down the road and finally raised the expansion joint headers. Next came three joint finishers and edgers. Over the expansion joints and contraction joints they used 5-foot straight-edges made by cutting the regular 10-foot straight-edges in halves and placing a handle over the center. These showed quickly whether there was any inequality between the adjacent slabs.

Complete Curing with Earth

Most concrete men can remember when we placed the burlap for curing dry and wet it immediately, or as soon as possible after it was placed. Now the burlap is placed wet. Some contractor found out that he got a better slab and made the change which has been universally adopted. Ziegler has a method of applying the earth that should be made compulsory as it does for the final curing what ponding does.

The initial curing is with the wet burlap placed by two men from a burlap bridge. This remains on over night and is kept wet throughout the night if the weather is such as to dry it. The next morning a curing crew of ten men picks up the burlap and forms and the slab is given its final checking with a metal straight-edge. Here is where the improvement in curing starts. The slab is then wet down thoroughly and 1 inch of dirt spread and wet. As soon as the crew reaches the far end of the slab poured the previous day they return and spread the second inch of dirt required and wet that. This insures that the slab is wet at once, that the dirt against the slab is wet and that moisture is applied to the top to keep in the water below. The sprinkling is continued for the full ten days required, using 6 to 10 men.



C. & E. M. Photo

The Joint Outfit Blowing and Pouring an Open Expansion Joint

After the final curing was ended an independent crew cleaned and poured the open expansion and the contraction joint slots. These men used a 1-cylinder Curtis air compressor to furnish air for blowing out the dirt from the joints and then poured the joints with asphalt from conical pouring pots. A 50-gallon Littleford heating kettle was used for heating the asphalt as this size is easy to manipulate and is readily run up onto the truck when it is time to move.

The shoulder crew used a LeTourneau 5-yard drag scraper pulled by an RD7 for moving dirt into low spots and for cutting high ones along the shoulder. The shoulder slope and the front slope of the ditch was cut with a simple extension of the blade made by drilling an old blade and the end of the blade on the Caterpillar No. 10 Auto Patrol so that the extension could be bolted on at the correct angle. It had a handle on the outer end for one man to guide it and lift when necessary to clear obstructions quickly. In this way the 5-foot shoulder and the top of the front slope were cut to an even line.

A mule team hauling a rubber-tired wagon handled the moving of forms forward and also carried the burlap ahead.

Personnel

The contract for the 10.2 miles of 7-5-7-inch section pavement 20 feet wide to be completed in 175 working days was awarded to the Ziegler Construction Co. of Nashville, Tenn., on its bid of $193,948.00. Sam Ziegler was Superintendent for the contractor. For the Mississippi State Highway Department, J. R. Scott was Project Engineer. Work on this project was finished in June, 1938.

If you have any special lubrication problems, write the Editor. He will be glad to help you.

CONTRACTS ARE BEING AWARDED

ON THE STRENGTH OF NEW EQUIPMENT.

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VERSATILE

New Jersey Gathers Road Accident Data

(*Continued from page 24*)

tures required in other roads of similar characteristics to provide a maximum of safety.

Three stretches of road were selected for the experiments. Project No. 1, 3.3 miles on New Jersey Route 25 from Elizabeth to the Newark Viaduct, unlighted from August 1 to October 31, 1936, had 82 non-fatal daytime accidents, one fatal daytime accident, 20 non-fatal and no fatal night accidents, with an average traffic volume of 44,500 vehicles per 24 hours.

On August 1, 1937, lighting units consisting of 400-cp lamps on 400-foot centers were turned on. Later, on November 1, the spacings were reduced to 200 feet and the lamp sizes to 250 cp. In Stage A (400-cp units on 400-foot centers) from August 1 to October 31, 1937, there were 56 non-fatal and no fatal day accidents and 28 non-fatal and one fatal night accident, with an average traffic volume of 50,700 vehicles. The traffic volume in 1937 increased 13.68 per cent and the night accidents increased 40 per cent. In Stage B (250-cp units on 200-foot centers), the unlighted period from January 1 to July 31, 1937, had 57 non-fatal and no fatal day accidents and 61 non-fatal and three fatal night accidents, with an average traffic volume of 63,800, while during the lighted period the following year there were 110 non-fatal and 8 fatal day accidents and 59 non-fatal and no fatal night accidents, with an average traffic volume of 70,200 vehicles. The traffic volume in 1938 increased more than 10 per cent, night accidents decreased and fatal night accidents were eliminated.

The abnormal six-lane dark surface of the roadway absorbs much of the light of the 250-cp units and does not reflect sufficient light to give proper visibility to motorists ordinarily traveling at high speed on this highway at night. The intensity of these lamps has now been increased from 250 cp to 400 cp to give better visibility and permit traffic to move with greater safety. This will be known as Stage C and sufficient data has not yet been recorded to make final observations.

Project No. 2 was a 12-mile stretch on Route 4 from the George Washington Bridge to Paterson. From January 1 to September 30, 1937, there were 138 non-fatal and 2 fatal day accidents and 101 non-fatal and 5 fatal night accidents, with an average traffic volume of 55,577 vehicles per 24 hours. On December 4, 1937, lighting units were turned on, using 400-cp and 600-cp lamps on 200-foot centers in the built-up areas and 400-foot centers in the rural areas. From January 1 to September 30, 1938, there were 161 non-fatal and three fatal day accidents and 74 non-fatal and two fatal night accidents, with an average traffic volume of 58,611 vehicles. The traffic volume increased 5.46 per cent in 1938, night accidents decreased 26 per cent and fatal night accidents decreased 60 per cent.

Project No. 3 was an 11-mile stretch on White Horse Pike (N. J. Route 43) from Absecon to Egg Harbor. A check on this highway from May 24 to September 24, 1937, showed 14 non-fatal and no fatal day accidents and 18 non-fatal and three fatal night accidents, with an average traffic volume of 9,300 vehicles. On May 13, 1938, lighting units were turned on, using 400 and 600-cp lamps on 200-foot centers. From May 24 to September 24, 1938, there were 28 non-fatal and no fatal day accidents and 18 non-fatal and no fatal night accidents, with an average traffic volume of 12,650 vehicles. Traffic increased 35 per cent in 1938 and fatal night accidents were eliminated during this period. During the Fourth of July holidays, for the first time in its history, this stretch of Route 43 experienced an "accident holiday" for not a single night accident was recorded.

Highway Lighting Studies

In order to make comparative studies of incandescent and sodium lighting, one mile of 6,000-lumen sodium vapor units has been installed on the White Horse Pike, fifty 6,000 lumen units on Routes 2 and 6 and eighty-eight on the boulevard between the Camden Airport Circle and Twelfth Street, Camden. On these installations, luminaires of various manufacturers were placed alongside each other in order that accurate cost data might be compiled, in addition to the studies of sodium vapor light itself.

In 1937, Commissioner Sterner succeeded in having set aside $150,000 to give financial assistance for lighting in municipalities. After an informal conference with representatives of the municipalities and safety and lighting engineers, the consensus of opinion was that sections of highways be selected, regardless of municipal boundary lines, where from a standpoint of traffic volume and accident frequency it was felt that highway lighting would curtail the largest percentage of accidents and that these municipalities affected be reimbursed for the lighting within their boundaries.

The necessity for lighting traffic circles, underpasses, bridges and important intersections was taken for granted and with the exception of the latter, the State Highway Department bears the complete cost of installation and maintenance of the required lighting systems at these points. In the case of important intersections and sections of straightaways where either the night accident rate or the traffic volume warrants it, the Highway Department shares the installation and maintenance costs with the county or municipality involved.

From studies recently completed from our "highway accident laboratories," it was found that 250-cp lamps, staggered 200 feet apart, using 25-foot mounting heights and approved highway lighting fixtures on mast arms of sufficient length to bring the unit at least 3 feet over the edge of the paved roadway, produced sufficient illumination on light colored pavements to silhouette objects on the highway sufficiently to permit an automobile driver obeying the state motor vehicle laws to operate a car in good condition on state highways in comparative safety.

Many municipalities, where installations were contemplated, volunteered to increase the lamp sizes to 4,000 or 6,000 lumen, obtaining the equivalent cost of 2,500-lumen lamps from the state. It was generally conceded that, in the case of municipalities where ad-

(*Concluded on next page*)

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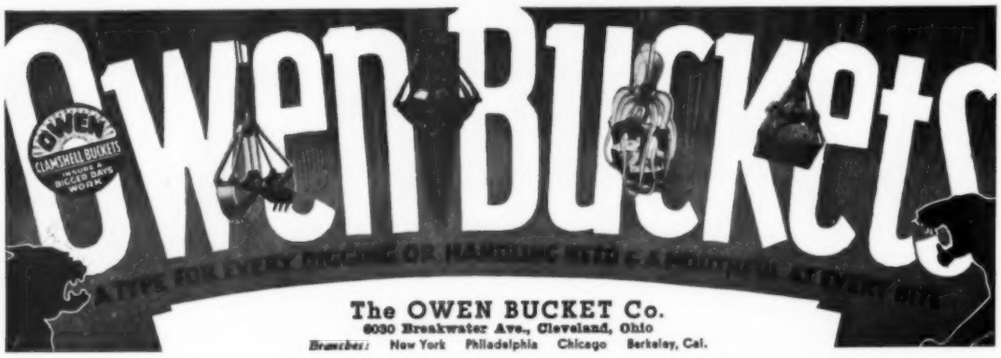
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Lighting Studies Help To Map Future Plans

(Continued from preceding page)

ditional hazards were created by local automobiles or pedestrians entering or leaving the highway, the municipality should share the cost of eliminating the hazard. It was also felt that they should provide light on the highway on a par with the light they furnished on other streets of equal importance, in return for the local taxes collected, particularly where there was improved real estate fronting on the state highway.

The Highway Lighting Program

The recently completed lighting installation on White Horse Pike from Camden to Absecon makes this the longest continuously lighted section of highway in the United States. This section, 50 miles in length, traverses twenty-two municipalities. The units used include 192 6,000-lumen units, 196 4,000-lumen and 812 2,500-lumen units, all incandescent, in the new acorn-type luminaires. Twenty-four 6,000-lumen sodium units of different types were installed in adjoining sections near Abescon, so that comparisons could be easily made of the various fixtures. This lighting is paid for partly from state highway funds and partly by the municipalities through which the route passes.

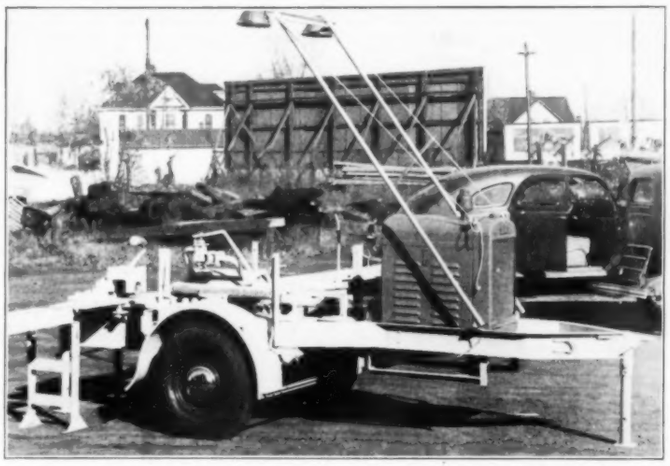
In addition to the 1,200 lighting units on White Horse Pike, approximately 4,800 incandescent units are to be installed in various municipalities under the State Highway Reimbursement Program. In addition, plans have been made for the installation, before the summer of 1939, of additional highway lighting units at every important county and state highway intersection. This will complete the program of safety lighting at all important cross roads and in congested urban areas.

It will be about a year before final results will be available, but the State Highway Department engineers will then have at their disposal very valuable data on the subject which is not now available anywhere.

Field Repair Press For Crawler Treads

Electrically driven stationary and truck-mounted presses for the repair of crawler treads have been manufactured for some time by the Wm. Bros Boiler & Mfg. Co., Inc., Road Machinery Division, Minneapolis, Minn. Now this company has announced a portable semi-trailer track repair press for use in the field. The new unit, arranged so that it can be towed by a passenger car, is completely equipped with roller runways, flood lights and tool boxes which nest together compactly for easy portability.

The press consists of a sturdy steel frame carrying a large diameter ground steel cylinder fitted with a cast iron piston and rings, no leather packing being used. The operating pump is a gear-type roller-bearing Nitralloy unit with integral relief valve, operating at a maximum pressure of 2,000 pounds per square inch which delivers a pressure of 100 tons on the ram. The operating piston valve is fully balanced and is inter-connected with the throttle of the operating gasoline engine so that the motor idles except during the pressure stroke of the piston. The gasoline engine is fully equipped with a generator and starter. Large-size tool boxes are provided to carry the necessary track-repairing equipment.



The New Bros Semi-Trailer Track Pin Press for Repairing Crawler-Tractor Treads

Operations with the press are so arranged that to repair crawler tracks having non-interlocking single-diameter bushings it is unnecessary to remove the track plates. On the few tracks where the plates must be removed, a spacer tool is provided to space the rails correctly without an extra operation. The manufacturer claims that with this field press four large-size or six small-size tracks can be overhauled and repaired in one day.

Further information on the portable track repair press may be secured by those interested direct from the manufacturer or from this magazine.

Want any information on equipment? Write the Editor.

Be sure it's the

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For Checking Concrete Surface

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While Much Shaping Was Done During Both Dry and Damp Mixing, the Auto Patrol Brought the Road to Final Line and Grade

Cement-Stabilized Road Constructed in Maryland

(*Continued from page* 11)

In dry mixing, the next operation, the soil and cement were worked with harrow and cultivator until thoroughly mixed for the full 6-inch depth. Such material as worked outside the 16-foot width was pulled back by a one-man power grader.

Enough water to bring the moisture content of the soil-cement mixture up to the required 10 per cent optimum was then applied. Two gravity tank trucks, one of 1,000-gallon capacity and the other of 750-gallon, were used. Following the tank trucks came the disc harrow and cultivator to mix soil, cement and water thoroughly. The water-application experience with gravity tanks showed the need and economy of pressure distributors.

Two sheepsfoot rollers then compacted the damp mix until only about 1 inch of mulch remained. A spike-tooth harrow knocked off the bumps, filled holes, and scratched out compaction planes. If the mulch was below optimum moisture content so that maximum density could not be secured, water was added as needed.

The grader was used during both dry and damp mixing to keep the section to approximate line and grade, thus reducing the final shaping operation to a minimum.

Processing on curves requiring superelevation presented some difficulty at first, since the floury soil-cement tended to flow away from the top edge of the curve. This tendency was overcome by using the power grader which made as many trips as were necessary to get the full 6-inch uniform depth of processed soil over the entire road width.

Immediately after shaping, moist soil was loosened to a depth of about ¾ inch by the spike-tooth harrow so that rolling would leave the surface uniformly smooth. Particular attention was paid to those places where the pneumatic tires of the power grader wheels had compacted the soil.

Following shaping, the entire section was rolled in one and one-half trips of a 10-ton 3-wheel roller. If the surface became dry during this operation, it was given a light shot of water to bring it back to the optimum moisture content. Then beginning at the road edges, the entire section was rolled, the rear wheels of the 3-wheel roller lapping previous trips by one-half to three-quarters of a wheel width.

The final operation consisted in covering the section to prevent surface evaporation. The power grader windrowed shoulder material from each side of the road on to the processed surface, finally covering it with a blanket of earth from 3 to 4 inches thick. If the surface had dried out during the last rolling, a little water was applied to it before covering. The surface usually was covered the morning after each day's run, but if rain threatened it was covered immediately after the final roll-

(*Concluded on page* 50)

Device Marks Bumps In Asphalt Pavement

The practice of cross-rolling asphalt-concrete pavement in California emphasized the need for a device to define waves or bumps in the surface. Such a machine, which automatically marks and locates any irregularities, has recently been developed by E. L. Seitz, Resident Engineer, District 7, California Division of Highways. Used on several road construction jobs, the practical application of the device has been successfully demonstrated.

It consists of a centrally hinged frame mounted on four wheels, one at either end and two in the middle. One extended end of the frame holds a lever in the end of which is a crayon. This bears upon the road surface wherever an irregularity occurs. The crayon is fed downward as it wears away by means of an automatic feed which eliminates the need of attention, except for replacement of the crayon. Several methods were tried before this feed was worked out satisfactorily. A small rubber wheel attached to the end of the crayon arm rests on the pavement when the arm is placed in marking position. As the wheel turns it moves a worm feed screw which keeps the chalk a fixed distance beyond the end of the holder.

The machine accurately marks bumps 1/16 of an inch in height over a length of 5 feet or less. An adjustment screw permits the marker arm to be raised or lowered for marking bumps of varying height.

The whole is simple in construction, with no springs nor weights. It weighs about 30 pounds, and can be folded at the middle so that it can be easily carried in an automobile. Its use is equally simple, so that with a little practice bumps can be quickly indicated and rolled out with a smoothness not possible otherwise.

As the Bumpograph Is Pushed Over the Pavement, It Marks Any Small Bumps

Paper in Concrete Roads

The use of building paper between the foundation and the concrete is now obligatory in the construction of German motor roads, according to a report in *Highway Research Abstracts*. The paper need not be waterproof but must retain a minimum bursting strength of 3.55 pounds per square inch over a circular surface 6 square inches in area after two hours immersion in water.

Further specifications state that the material must weigh 4.4 to 5.3 ounces per square yard and not form wrinkles in wet or windy weather. It is supplied in rolls as wide as practicable. A minimum overlap of 2 inches at the edges and 8 inches at the ends must be provided, the direction of the overlaps on grades, etc., being such to prevent the entrance of water below the paper.

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You want more than dead weight in a bucket to lick a tough digging job. You want speed—agility! Williams design, welded construction and special alloys insure stamina and ruggedness, without excessive weight. Williams Buckets carry plenty of weight, but they carry it in the right places and in the right proportions. You move more materials in less time with Williams Buckets—and that's profitable.
. . . and if that's what you want in a bucket, you'll find your particular type in the Williams Catalog. It's free!
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SILVER KING
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Years of experience and hundreds of owners prove without a doubt the Silver King Highway Mower does an outstanding job the year around. In addition to the annual Spring-to-Fall weed-mowing job, it is an ideal maintenance unit. It is also used for leaf removal in the Fall, snow removal in the Winter. Cities, counties and states all find the Silver King the first practical all-purpose mower. Without obligation, send for the Silver King Bulletin, "For Year 'Round Economy."
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Send for this FREE FOLDER!

Contractors Pump Bureau Affiliated with A. G. C.

Affiliation of the Contractors Pump Bureau as a unit of the Cooperative Construction Bureau of the Associated General Contractors of America was approved at the A. G. C.'s Governing and Advisory Boards meeting in November. Approval was also given to standards for contractors' pumps submitted by the manufacturers who are members of the Bureau. These standards cover self-priming centrifugal, road, diaphragm, and plunger pumps.

Manufacturers who are members of the Bureau include Barnes Mfg. Co., C. H. & E. Mfg. Co., Chain Belt Co., Construction Machinery Co., Gorman-Rupp Co., Jaeger Machine Co., Marlow Pumps, Novo Engine Co., and Sterling Machinery Co.

Standard rating plates, similar to those used by the Mixer Manufacturers Bureau, will be issued. The plates will be attached to each standard pump, and any manufacturer violating the standards will be refused plates by the A. G. C. The standards, approved by the A. G. C. Board on recommendation of the Committee on Endorsements, cover sizes, nomenclature, capacities, engines, standard equipment, etc.

Massachusetts is shifting from light trucks to heavier all-wheel-drive trucks for snow removal, because of the speed and power of the latter units. At the same time, the number of tractors in snow removal work is being reduced, said J. E. Lawrence, Maintenance Engineer, Massachusetts Department of Public Works, in a paper at the 1938 Highway Research Board meeting.

New Equipment Lines For Chicago Dealer

The Great Lakes Supply Co., 824 West 36th St., Chicago, Ill., has been appointed equipment distributor for the Osgood line of excavating equipment, Hercules road rollers, and General excavators in the northern half of Illinois and the counties in Indiana adjacent to the Chicago territory.

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This Service also provides a Special Asphalt Representative, located near your city, who is ready to help you choose the most economical type of construction for *your* particular needs. He can supply tested specifications, estimate costs and suggest economical methods of handling your materials.

This Service has but one objective—to help you get more miles of improved roads from your road fund dollars. You can reach this Special Asphalt Representative in your territory through any Standard Oil office or by writing Standard Oil (Indiana), 910 S. Michigan Ave., Chicago, Ill.

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Asphalt for every purpose STANDARD OIL COMPANY (INDIANA)

This Fleet of Cummins-Diesel-Engine-Powered Sterling Tractors Are Hauling the Rock for a New Jetty at Protect Barnegat, N. J.

Hauling Heavy Rock For Barnegat Jetty

Long semi-trailers pulled by chain-drive tractors are being used to haul rock for the construction of a mile-long jetty to protect the historic Barnegat Lighthouse and the City of Barnegat, N. J. Two stone jetties are being constructed, one on each side of the Inlet, to check the southern sweep of the ocean current which has eroded the land on which the lighthouse stands.

The rock is being loaded into skips at a quarry in Pennington, N. J., and then three skips placed on each of the 17-foot semi-trailers for the 77-mile haul. Since there is no road to the north jetty, the rock is hauled to the southern side where the skips are lifted and conveyed across the Inlet on cables strung between 150-foot high towers. The towers and cables carry rocks weighing as much as 10 tons.

The ten Sterling chain-drive tractors powered with Cummins diesel engines travel approximately 462 miles per day, carrying 15 to 20 tons of rock per load, and the work is to continue for about twelve months. An auxiliary transmission is used in conjunction with a four-speed unit transmission on the Sterling Model HC147-HB chain drives, providing twelve forward ratios and three reverse. Road speeds up to 48 miles per hour can be obtained.

New Engine For Use In Small Power Field

A new 4-cylinder engine has recently been added to the line of industrial engines made by the Waukesha Motor Co., Waukesha, Wis. Developing 10 to 18-hp, this Meteor Four is designed to use with 3 to 7½-kw generators, contractors' pumps, or as a starting motor for large engines or power units. Its field of service is widened by the fact that various cylinder head combinations are available which permit operation on gasoline, natural gas or butane.

This unit has a 2½ x 3⅛-inch bore and stroke and weighs approximately 138 pounds. The crankcase and cylinder blocks are separate castings, the latter of molychrome iron and the former drop-forged, heat-treated and mounted on two large ball bearings. Connecting rods, also drop-forged and heat-treated, are fitted with steel-backed babbitt-lined precision bushings in the large end and precision bronze bushings in the floating piston pin end.

One of the major features of the Meteor Four is the Waukesha centrifugal governor, which is built into the engine and driven by the timing gears. Entirely enclosed, sealed and lubricated by the engine oiling system, it has big parts and hardened and ground bearings to provide long life and permit close regulation. Ignition is by distributor or magneto mounted on the side opposite and away from the heat of the manifold. The distributor is driven by a spiral gear integral with the camshaft while the magneto is flange-mounted and driven by the timing gears. The starter is on the same side as the ignition and is equipped with a single reduction Bendix pinion shaft which meshes with a heat-treated and hardened steel ring gear shrunk upon the flywheel.

Poor Dowel Placing May Damage Concrete

While more care has been taken with the spacing and alignment of dowels at transverse joints in concrete pavements in the last few years, there is still need for further improvement. Many contractors and some manufacturers have developed devices for holding dowels accurately in place until the concrete has been poured. It is not known whether all of these devices support the dowels in such a manner that they are not disturbed when the supporting devices are removed.

A paper, "Design of Dowels in Transverse Joints of Concrete Pavements," by Bengt F. Friberg, Research Engineer, Laclede Steel Co., St. Louis, Mo., appearing on pages 1809-1828 of the November 1938 issue of *Proceedings*, American Society of Civil Engineers, states: "Stresses due to inaccurate dowel installation have been determined. With extreme joint movements, they may exceed the stresses due to traffic loads unless care is given to this construction detail. Observed concrete failures under known conditions of dowel misalignment indicate the presence of high ultimate concrete compression stresses in the confined space around the dowels. A design stress of 2,000 pounds per square inch between the dowel and the concrete appears justifiable. Dowels should be aligned with extreme care if they are to perform their function during the life of the pavement. Satisfactory dowel performance can be obtained with less weight of steel than is now used, but as the dowels are shortened, increasing care must be given the exactness of the supports and spacing of the dowels."

New Electric Motors For Hoists, Cranes

New industrial electric motors, designed for use with cranes, hoists, bascule, lift and swing bridges, rotary car dumpers and similar applications, have been announced by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Penna. These motors are rated for intermittent service and a complete line with interchangeable ball or roller bearings is available.

Sealed-sleeve bearings seal the dust, grit or dirt out and the clean oil in, to provide thorough lubrication. The motors are insulated with taped end-turns which resist moisture, oil, dust and mild chemicals. Single-row wide inner-race ball bearings, double-row bearings or roller bearings are used, as determined by load conditions. An overflow sump helps prevent over-greasing and makes unnecessary the previous practice of dismantling the bearings to remove old grease.

A 4-page illustrated leaflet No. 3530 describing these open, totally enclosed or splash-proof types of motors of from 1 to 200 hp may be secured by those interested direct from the manufacturer.

SHUNK

D-K SPREADER and Finishing Machine

- Lays any type mix, hot or cold
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Spreads and automatically grades in one operation
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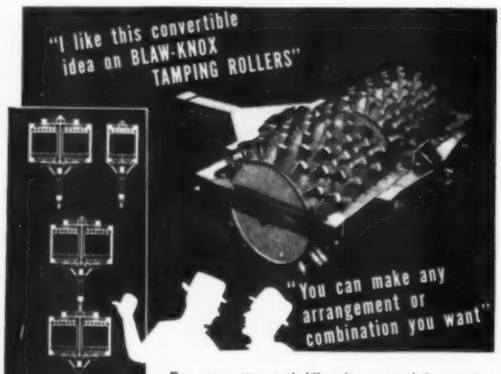

For compacting earth fills—the practical design of Blaw-Knox Sheepsfoot TAMPING ROLLERS appeals to contractors because they give uninterrupted service and meet all modern specification requirements.

The roller units are full floating, on husky frames—built for long, hard use.

Send for complete details and prices.

BLAW-KNOX DIVISION of Blaw-Knox Company
FARMER'S BANK BUILDING PITTSBURGH, PENNA.

BLAW-KNOX Sheepsfoot TAMPING ROLLERS

SURE! that's why I use a BLAW-KNOX Rehandling Bucket—big yardage every day with full utilization of crane capacity—I'm getting maximum return on my crane investment, too.

Bulletin 1606 entitled Blaw-Knox Buckets for Contractors shows how to select a bucket to secure the profitable difference between peak and ordinary performance—it will be sent on request.

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FARMER'S BANK BUILDING PITTSBURGH, PA.

BLAW-KNOX REHANDLING BUCKETS

Snow Removal In Wisconsin

All Winter Maintenance, Including Ice Control And Snow Fence, Done By Counties for State

By WILLIAM HOENIG, Maintenance Engineer, Wisconsin State Highway Commission

✦ IN Wisconsin the entire state trunk highway system, consisting of 10,000 miles, is kept open for travel during the winter season. All work of snow removal, drift prevention and ice control, as well as the other phases of highway maintenance, is carried on by the county organizations with county-owned equipment under the supervision of the State Highway Commission. Through the main and division offices, the necessary maintenance work is planned and arrangements for sufficient equipment, lay-out of the work, and similar details made with the county organizations, all the actual work being done by the counties.

Each county in the state has a shop where its equipment is stored and kept in repair. In many of the counties, where necessary, there are auxiliary sheds located at strategic points where snow removal equipment is stored so that the equipment can be put in operation immediately without moving any of it any great distance.

During the season of 1937-38, 1,200 miles of lath snow fence was erected to prevent drifts, 958 trucks equipped with V-shaped snow plows, 186 tractors equipped with large plows, and 510 motor graders used for winter maintenance. All of the large plows on the trucks and tractors are hydraulically operated and the crews operating this equipment are usually shifted every 8 to 12 hours so that the equipment is worked 24 hours a day when necessary.

For light snowfalls, ranging from 2 to 6 inches, motor graders and light trucks with moldboard plows are used to clear the highways. In heavier snowfalls and when drifting starts, the heavy trucks with the V plows are put into operation. The tractors with the heavy plows are used only for widening cuts and in emergencies and high drifts. Under very severe drifting conditions, power shovels equipped with 3 to 3½-yard buckets are used in opening cuts, but this occurs only in rare instances.

The Ice Problem

In the past three or four years, ice control has been more of a maintenance problem than snow removal, due to the fact that there have been heavy rains at freezing temperatures during the winter. When this condition exists, all curves, turns, hills, approaches to grade crossings, and intersections are immediately covered with sand or cinders to which is added 50 pounds of chloride per cubic yard and spread at these locations by mechanical spreaders attached to trucks. Last season 2,500 tons of chloride and 100,000 cubic yards of sand and cinders were used for this work. Just as soon as icy conditions occur, the organization throughout the state goes into action with trucks and sand spreaders, taking care of these locations from stockpiles of sand and cinders which are placed along the highways at these points in the autumn.

Usually most of the ice troubles are in the southern half of the state. Last season the snowfall was below normal in the southern part of the state and somewhat above normal in the northern part of the state. These conditions change, however, and very often there are heavier snowfalls in the southern part of the state than in the north so preparations are made for all these conditions in advance and the equipment kept in readiness for any emergency so that the whole state trunk highway system is kept open and safe for travel at all times.

Financing the Work

All maintenance work done by the counties on the state highway system is paid for by the state, an agreement having been made with each county for a uniform allowance for the different types of equipment for the hours that it is actually used. Each month the counties submit detailed itemized requisitions showing the hours of labor and equipment used for the work planned by the State Highway Commission and carried out by the counties during that month, and the state reimburses the counties each month for actual expenditures.

Not All Wings Are Made for Flying. On This Snow-Plowing Rig, They Are Widening the Plowed Section on a Highway in Wisconsin

During the 1937-38 season, the total cost of winter maintenance was $1,213,886, which was made up of an expenditure of $547,508 for snow removal, $199,424 for drift prevention, and $466,953 for ice control.

The gas tax costs a motor vehicle owner about ½ cent per vehicle-mile, but the mud tax may be from five to ten times as much. Discussion at the Highway Research Board meeting in December showed that the variation in cost of operation of vehicles on good and bad roads may be as much as 2 to 12 cents per mile. A reduction of cost of operation of 1 cent per vehicle mile will save a total of 2½ billion dollars per year in the United States.

WESTWARD HO!

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SPECIAL TRAIN AND PLANE RATES TO SAN FRANCISCO WILL BE IN EFFECT.

FOR '39 HIGHWAY PROGRESS

The starting gun for tomorrow's highway construction will be fired in San Francisco's Civic Auditorium. Problems will be solved, plans will be made, ideas will be born!

Brand-new equipment to provide better and safer roads for the highway user and increased prosperity for the highway builder will be on display.

Convention sessions will present a program of profit for the county, municipal and state officials, highway engineers, manufacturers and their distributors, educators, highway contractors, highway planners and Pan-American and European delegates.

Incidentally, the vacation touch will always be close at hand, with the Exposition on Treasure Island in the Bay!

Put a ring around March 7, 8, 9, 10 on your calendar! Try your whistle on "California, Here I Come!"

Keep in step with America's traffic demands. Learn how to build the "highways of tomorrow"—learn how to maintain them!

Join the parade of highway progress!

Gather at Golden Gate!

HIGHWAYS OF TOMORROW
AMERICAN ROAD BUILDERS' ASSOCIATION
36TH CONVENTION AND HIGHWAY EXHIBIT

CIVIC AUDITORIUM • SAN FRANCISCO
MARCH 7, 8, 9, 10, 1939
HIGHWAYS OF TOMORROW

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AMERICAN ROAD BUILDERS' ASSN. 1902

MAIL HOTEL RESERVATIONS TO ABBA HOUSING COMMITTEE, CIVIC AUDITORIUM, SAN FRANCISCO.

The Shop Section of the Garage at the Craig Depot of the Colorado State Highway Department, in the Northwestern Part of the State

Well-Planned Depot For Colo. Hwy. Dept.

(*Continued from page 34*)

a capacity of 30 tons. Coal is dumped through a manhole on the grade line to the bin. Hot water is furnished by a gas water heater.

There are gas, 110-volt and 220-volt current, and air outlets in several parts of the main garage as well as several points on work bench.

Outside of the main building are 20 sheds, 12 x 22 feet, which are used for the dead storage of equipment and for the storage of iron, lumber, grader blades and parts too large for the stock room, and for a paint room with paint gun and exhaust fan.

The grounds cover 2 acres, fenced with 2-inch mesh wire on 4-inch steel posts. A supply of fence posts, wire, snow fence, culverts, etc., is kept on hand. All salvaged material, such as bridge timbers, culverts, etc., as well as surplus material from contract jobs, come to the maintenance depot for redistribution as needed.

The shop is equipped with the following machines and appliances: connecting rod aligner, generator voltage tester, battery charger, gas pump and 1,000-gallon tank, power saw, power blower, blacksmith outfit, power hammer, generator test bench, 60-ton press, 16-inch lathe and lathe converter, portable arc welder, shop arc welder, acetylene welding outfit, two bench grinders, power drill press, brake riveting machine, chemical cleaner, air compressor, hydraulic floor jacks, 5-ton traveling crane, portable power compressor and paint gun, boring bar, valve shop, pinhole grinder, fuel-pump tester, combustion analyzer, growler, coil tester, condenser tester, vacuum gage, two electric drills, ridge reamer, glass cutting table and a very complete set of bench tools.

The personnel of the Craig maintenance depot is as follows: division superintendent, clerk, division mechanic, two shop mechanics, two helpers, stock room clerk and janitor-watchman.

Repair Work Important

Although minor equipment repairs are made by the patrolman and helper or by one of the mechanics from the division shop, who travels over the division, general repairs and overhauls are made at the maintenance depot at Craig.

The cleaning, overhauling and painting of the equipment before it goes out is very generally understood. What is not so well understood is the time and expense of the small jobs that come into a shop—the carburetor, generator, fuel pump, the little jobs of welding, the thousand and one things that get on the mechanics' nerves and take their time from an overhaul job. The method of handling these small irritations is the determining factor in the successful handling of a shop. At this time we regret to state that we do not know all of the answers.

In the shop at Craig, considerable work besides repairs is done. For instance, one of the patrolmen designed and built a winch, mounted on a 3½-ton truck and run off the main drive shaft. Now these winches are built in the Craig shop and mounted on all trucks of this type. The same patrolman developed and built a ditching machine, a number of which have been built in the shop.

New Depot Pops Up Staff

The completeness of the new maintenance depot and its contrast with the old quarters had a very marked effect on the men in the shop. More accurately, it had two effects. The first was an increased pride in their jobs and their work; the second was comparable to the excitement of Christmas morning. We all wanted to play with the new equipment. Gradually, however, we are getting our feet back on the ground and can very definitely see a reduction in the cost of our maintenance.

New Practical Book On Roadside Work

We are glad to welcome a new book on roadside development, a book which expresses the feeling that, to be worthwhile, roadside work must increase the safety of a highway and must not add to the ultimate expenditure for the highway. "American Highways and Roadsides," by Jac L. Gubbels, Landscape Engineer of the Texas Highway Department, in the 91 pages of text "sells" roadside development better than any publication we have been privileged to read.

Mr. Gubbels traces most of the ills of highway development today to a lack of appreciation of the fundamental principles of psychology and drainage. He shows how highways can be located to cause the driver of a motor vehicle subconsciously to reduce speed and to realize that there is a turn in the road or a danger point ahead.

The question of drainage has been ignored in too many highway projects. Mr. Gubbels points out that highways in the past have seldom been located with proper thought given to the natural flow of water on a hillside. Concrete examples in the book will be of great value to county and state engineers and aid them in the ultimate economy of highway location, construction and maintenance.

Copies of "American Highways and Roadsides" may be secured through this magazine. Price: $2.75.

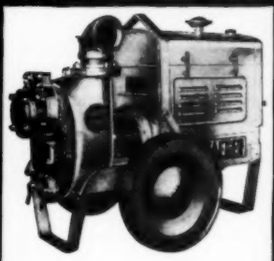
Portable Automatic Traffic Recorder

Most state and county highway departments have found traffic surveys of inestimable value in planning new highways and the necessary reconstruction of old ones, as well as in planning the installation of safety devices of various types in the campaign against traffic accidents. A new piece of equipment for aiding in taking and recording traffic counts has been announced by the Paver-Sills Co., 4101 No. Ravenswood Ave., Chicago, Ill.

The Traficounter, which is readily portable, is battery operated and is actuated through a road strip by the pressure of each axle load or traffic impact. It affords automatic continuous counting for seven days without attention, printing hourly records of traffic volume each hour on the hour. Accurate timing is provided by a Seth Thomas power clock movement. The road strips are easily installed on paved or unpaved roads and special multiple installations for recording the traffic in each lane of the highway are available as well as single installations.

Further information and suggestions on the type of installation which will best meet any special traffic-counting problems may be secured by state and county highway departments direct from the Paver-Sills Co. by mentioning this magazine.

BUYING A PUMP?



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A SPEEDY, RUGGED, VERSATILE MONEY MAKER . .

Simple in design and rugged in construction, the Model 375 AMERICAN GOPHER — Shovel — Crane — Dragline — is fast, versatile; handles like an automobile. High operating speed insures a high daily yardage — and ruggedness insures steady protection. A fast traveler. Write Department CE for Bulletin 700-G-5-2, just out.

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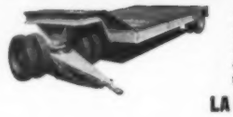

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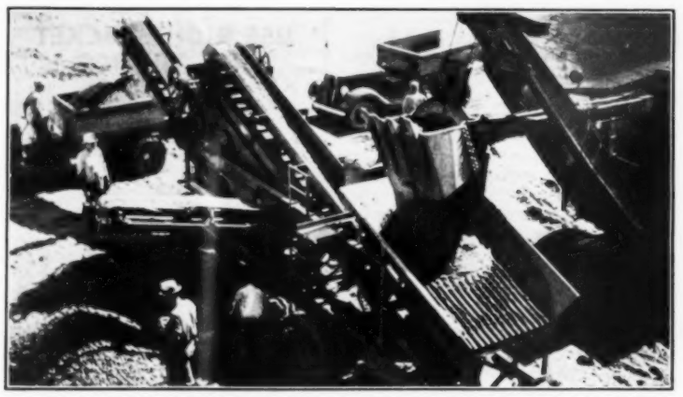

For Use on Stabilized Road Construction in Minnesota, This Processing Plant Was Specially Built for De Ruyter Bros. to Handle Gravel or Clay, and to Change from One Material to the Other with a Minimum Loss of Time

Unusual Plant Built For Gravel or Clay

A Minnesota contractor working on a low-cost stabilized road recently was confronted with the problem of securing a processing plant which was 100 per cent self-contained, highly portable, and capable of handling gravel and clay. The reason for this was that two types of material were needed on his job: run-of-bank gravel all passing a 1¼-inch square-mesh screen, and clay which had to pass through a ¾-inch square-mesh screen.

Because the gravel deposits and the clay deposits are usually in different locations and because of the nature of the work, it was necessary that the contractor produce his day's requirements of gravel and clay within the same working day. This meant that he must change from producing gravel to producing clay in a very short period of time in order to maintain a continuous production schedule on the job.

The contractor, DeRuyter Bros., Willmar, Minn., secured a plant which met these requirements. It consists of a 3-yard feed hopper with a bar grizzly over the top. Flaring sides were built on this hopper to facilitate and speed up the feeding of raw material, which was done with a ¾-yard shovel. A main feed conveyor 24 inches wide situated immediately under the hopper conveys the material to a 3 x 10-foot Telsmith Pulsator. This conveyor was slowed up to travel with a belt speed of 100 fpm to act as a feeder as well as a delivery conveyor. A quadrant bin gate to regulate the depth of material on the belt was built into the hopper. Immediately under the Pulsator is a 4-yard hopper acting as a storage bin or surge hopper to allow trucks being spotted under the loading conveyor.

The finished or sized product was loaded into trucks by a second 24-inch conveyor immediately under the second hopper. Oversize or waste passing over the screen was chuted to a third conveyor which carried the material off to the side where it was dumped back on the ground or into trucks. The entire plant is driven by a single gasoline engine mounted on the main frame structure. A double set of screen trays with the required size of wire cloth facilitated a quick change from producing gravel to clay production or back again. All of this equipment with the necessary transmission is mounted on a substantial structural steel chassis which in turn is mounted on dual pneumatic-tired wheels both front and rear. The rear wheels are equipped with hand brakes. A 3-yard Ford truck moved the plant from one pit to another or along the face of the deposit as work progressed.

DeRuyter Bros. reports that this plant, which was designed for a minimum capacity of 120 yards per hour, has handled 861 yards in five hours.

"On to California" is the watchword of road builders this year for the Road Conventions.

Texas Tries Wood Strip For Plane of Weakness

An experiment is being made by the Construction Division of the Texas State Highway Department in an endeavor to cut the costs of producing the longitudinal center plane of weakness in concrete highways. An experiment is being made on a 300-foot section of highway in Jefferson County, Texas, in which it is estimated the reduction in cost has been between 60 and 80 per cent.

According to E. B. Cape, Assistant Construction Engineer, the method is to insert a piece of green lumber, ¼-inch thick and 4 inches wide, in the bottom of the concrete slab running longitudinally along the center of the pavement, extending ¾-inch into the subgrade and held in place by alternating steel pins. This replaces other methods of producing a center plane of weakness by the insertion of premoulded strips, paper ribbons, or a slot later poured with asphalt.

Puller to Remove Cylinder Sleeves

The new OCT Universal cylinder sleeve puller No. 970, made by the Owatonna Tool Co., Owatonna, Minn., is designed to remove the cylinder sleeves in truck and tractor motors, regardless of the position of the cylinder head studs. Adjustable legs permit centering the tool easily while the hinged adaptor plates can be applied from the top and without taking the tool apart. The long pulling screw has a fine thread which assures an even steady pull while the thrust bearing under the forcing nut reduces friction to a minimum.

This tool, which is built to service over a hundred makes and models of truck and tractor engines using removable sleeves, is described in a new 144-page catalog on a variety of OTC time-saving tools, copies of which may be secured direct from the manufacturer by mentioning this item, or from this magazine.

Aeroil OIL BURNING CONTRACTORS' EQUIPMENT

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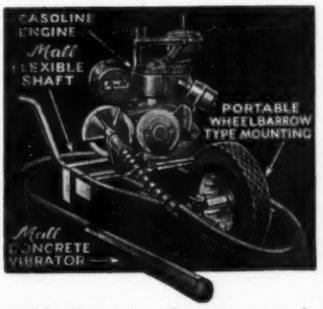

MALL Concrete vibrator powered with gas engine. Attachments can be furnished for SURFACING, DRILLING, SAWING, PUMPING and SANDING.

A multi-purpose machine!

They are earning hundreds of dollars for contractors everywhere. MALL vibrators eliminate honeycombs and expensive patching, save labor and material, and produce strong, durable concrete. There is a type and size—gas engine, air, or electric—5000, 7000, or 10,000 r.p.m.—for each specific concrete job.

Our engineers will gladly help you select the MALL best suited for your work. No cost or obligation!

MALL TOOL COMPANY

7743 South Chicago Avenue, Chicago, Illinois

OFFICES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

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THESE MEN KNOW FIRST THE VALUE OF

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Every man actually out on the job in any capacity sees daily the ruggedness and versatility that are built-in features of all Union pile-driving equipment.

Their approval goes back to the home office to be confirmed later by a job finished on schedule and by a hammer ready to move on to the next tough assignment.

Write us today for the full story. It spells E-C-O-N-O-M-Y in pile driving for 1939.

Size 3 Union Hammer, owned by Highway Dept. of Chenango Co., N.Y., driving piles for bridge foundation.

UNION IRON WORKS, INC.

P. O. BOX 18, ELIZABETH, N. J.

Orderly Confusion at the Opening of a New Gravel Pit Face at Grand Coulee. In Spite of Appearances, This Equipment All Knows Where It's Going and Does So Without Collisions

What? No Stop Lights?

The hazards of crossing Times Square or State and Madison Streets at their busiest times seemed nothing compared to the feat of crossing a new level of the gravel pit at Grand Coulee last September. The shelf on which the equipment was working was not over 200 feet in any direction and the working face was approximately 100 feet high. In this restricted area there were one 5-cubic-yard Bucyrus-Erie and one 4-cubic-yard Marion shovel, loading as fast as possible to five 12-yard trucks and two 30-yard tractor-hauled scrapers. In addition, a bulldozer and tractor moved in and out amongst the other equipment, now pushing accumulated material farther over to a hopper into which the material was being dumped, and again gathering material around the shovels.

To look at it, the little table-land was a mad house. Only motion pictures could give any conception of the "ordered confusion." To cross over to the farthest shovel seemed impossible without an airplane but finally the objective was reached, where stood Tom Swezea, gravel pit foreman for Consolidated Builders, Inc., contractor for the high dam.

"How do they do it?" he replied to a query. "You can search me. I don't know. Maybe the drivers have instincts, like bees swarming. Everyone seems to be in everyone else's way, but they never tangle."

"Is there any sort of signal system? Do you direct them in any way?" he was asked.

"Hell, no," he retorted. "If I got out there and commenced to wave my arms or something, to tell them which way to go, in the first place I wouldn't know what orders to signal when. In the second place, I would get myself run over in a little less than a minute and a half. In the third and last place, I'd have that bunch tied up in such a knot that you couldn't get 'em loose in a week."

Dust Collection Unit For Asphalt Plants

The need for the collection of dust from driers, asphalt plants and crushers located near residential or industrial communities has long been a matter of discussion. Buell Engineering Co., Inc., 70 Pine St., New York City, recently has announced a new dust collector employing the Van Tongeren system. The manufacturer states that this Buell collector has higher efficiency than ordinary cyclone collectors, maintenance costs are slight, and the operating costs practically nil.

The Buell dust collector harnesses the double eddy currents common to all dust collectors of the centrifugal type and which generally are regarded as a detrimental but unavoidable influence. At points where the current tends to concentrate ash in the main body of the cyclone, openings lead to a special outer dust channel. Carried out through the upper openings, then back through lower ones, the ash encounters the lower branch of the double eddy current and is borne on toward the ash outlet at the bottom.

There are two models which are identical in principle and differ only in certain details of construction. Model 130 is somewhat simpler, requires no inlet control damper, and handles wide fluctuations of load with uniform efficiency. It is also smaller than Model 150 units of equal capacity. This latter has a higher coefficient of extraction and is to be preferred whenever the value of the dust justifies a somewhat larger initial investment for its collection.

The Buell Engineering Co. has issued a new 8-page illustrated bulletin describing Buell dust collectors in detail. Copies will be furnished by writing direct to the manufacturer and mentioning this item, or to this magazine.

New Arc Welders Have Self-Indicating Control

A new line of Shield-Arc welders, claimed to provide greater convenience and accuracy because of a new self-indicating dual continuous control, has been announced by the Lincoln Electric Co., Cleveland, Ohio. These welders have both job selector and current control calibrated and equipped with dials which indicate the type of work and the number of amperes for each and every setting. This development enables the operator to vary both the slope of the volt-ampere curve and the amount of welding current independently and positively to suit every job encountered.

Another feature of this welder control is that both voltage control (job selector) and current control are continuous in operation, providing a very large number of possible combinations of voltage and current. Being continuous, the control can be advanced or retarded in increments as fine as desired. Other features of this new line of Lincoln welders include a self-protected motor on all ac motor-driven welders; separate excitation of the welding generators in all models of these new welders, providing a constant source of excitation independent of conditions at the welding arc; and a laminated magnetic circuit providing minimum reluctance to the flow of magnetic flux.

Complete information on this new line of Lincoln arc welders, which is available in ac and dc motor-driven models, may be secured from the manufacturer.

USE RIGHT BUCKET FOR THE JOB

Hayward makes all four — clam shell, drag-line, electric motor, orange peel. A Hayward recommendation is unprejudiced.

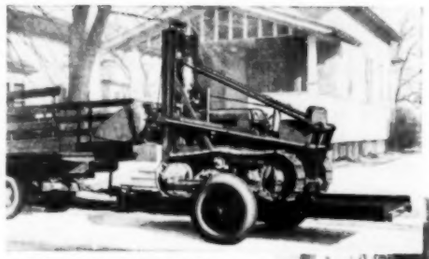
THE HAYWARD CO., 32-36 Dey St., New York

Hayward Buckets

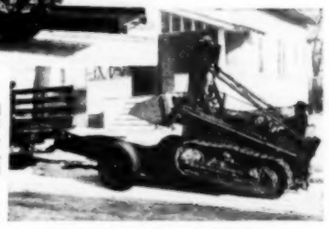
Tilting PLATFORM TRAILERS

for INDUSTRIAL HAULING!

EASY To Load—EASY To Haul!



• 1½ Tons to 10 Tons Capacity •



Reduces Delivery Costs

Now you can haul your machinery and other heavy equipment, the easy M-B way. Merely attach an M-B Tilting Industrial Trailer to your auto or truck. Only ONE MAN is required to load and unload.

Patented double hinged drawbar construction permits platform to be tilted for loading, thus forming its own ramp. No jacks—no cribbing—no skids required. When load is balanced, platform eases back to level position, where it is securely locked. Enroute, the patented spring suspension eliminates side sway,

Note Patented Tilting Feature

enables you to travel fast with safety. Speeds up deliveries. Reduces hauling costs. Complies with state laws. Write for bulletin.

Meili-Blumberg Corp., Box C-2, New Holstein, Wis.

MEILI-BLUMBERG

MANUFACTURERS OF INDUSTRIAL EQUIPMENT

In the March Issue of *Contractors & Engineers Monthly*

E. D. ETNYRE & COMPANY

OREGON, ILLINOIS

Manufacturers of oil, tar, asphalt, and emulsion distributors

WILL ANNOUNCE

new and revolutionary developments in spray bars on their 1939 Blacktopper Models

A Mechanical Spreader Running Gravel Screenings on Cotton Fabric on Pyramid Lake Road, Nevada

Cotton for Highways Tried Out in Nevada

(Continued from page 29)

season. There has been more scuffing and loss of material on the sections reinforced with cotton fabric than on the one without the fabric but the Nevada Department of Highways believes this is due, not to the fabric, but to the fact that no allowance was made for extra absorption of bituminous material by the cotton. Evidently there should have been more emulsified asphalt applied to the cotton section than to the section without it. The fabric has not pulled away from the base at any point and a little patching placed these sections in as good condition as when they first went down.

As far as maintenance costs are concerned, the costs to date are approximately $200 a mile which follows very closely costs on other types of road surfaces in Nevada which have the same amount of travel.

It is interesting to note that in addition to the sections just described, the Nevada Department of Highway constructed a 2-mile section of asphaltic road-mix surface, using Type SC2 material, immediately adjacent to the experimental section. Natural material was used, oiled and compacted to a 1-inch thickness. This section, which cost $682.67 a mile, is at the present time in better condition than the cotton fabric section and has cost less to maintain.

A New Welding Hose

The new Twinweld welding hose, two patents for which were recently issued to the Hewitt Rubber Corp., Buffalo, N. Y., consists of two lines of flexible cord-reinforced welding hose moulded into a single unit for conveying oxygen and acetylene for welding and cutting work. The individual passages have an inner lining of non-blooming gas-resisting compound, cord-reinforced, and the carcass is made to resist pressures many times greater than those incident to welding service.

The hose, which is available in any desired cut length or in continuous lengths as long as 500 feet, is installed by splitting it with a knife along the joint line at each end a sufficient distance to form a convenient Y at both the tank and torch ends. After the separation has been made, the ferrules, furnished free with the hose, are crimped to prevent any further separation of the two hose.

A two-color pictorial folder describing Twinweld, which was invented by Michael Berman, Technical Superintendent, and William Brockner, Plant Superintendent, Hewitt Rubber Corp., may be secured from the manufacturer.

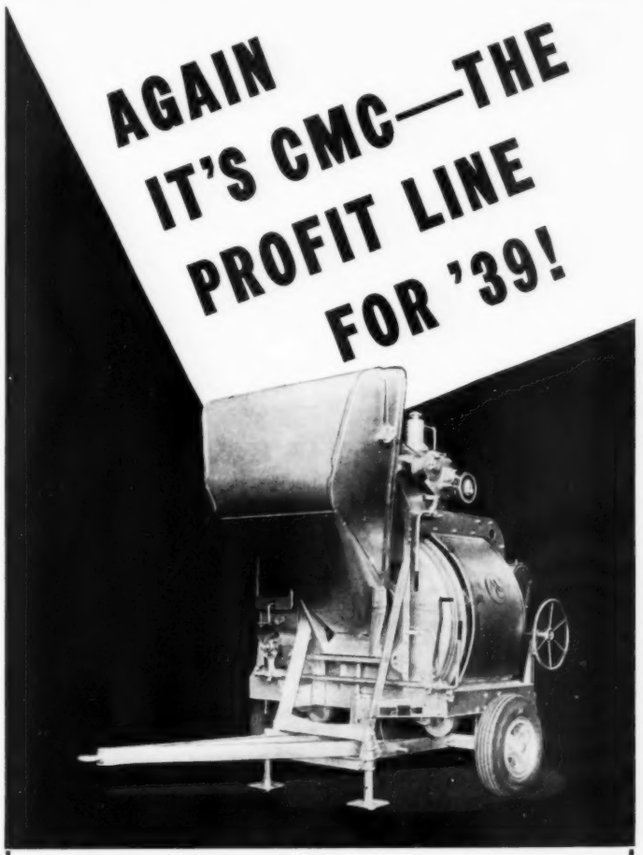
New Acetylene Flares

Three sizes of portable flare lights, particularly designed for contractors having outside work at night, have been announced by The Alexander Milburn Co., 1493 West Baltimore St., Baltimore, Md. The smallest, No. 10T, is made for use with the Type MC 10-cubic foot Prest-O-Lite acetylene tank. It is equipped with a 10-inch aluminum reflector, a tank connection, swing joint and stand pipe. The height of the attachment is 12 inches to the center of the burner and the overall height, including the tank, is 30 inches.

The intermediate size, No. 40T, is for use with Type B 40-cubic foot Prest-O-Lite tanks and is equipped with a 13-inch aluminum or porcelain reflector, tank connection, swing joint and stand pipe. The height is 18 inches to the center of the burner and the overall height, including the tank, is 40 inches. The large size, No. 150T, is made for use with 150-cubic foot acetylene tanks and is equipped with a 13-inch aluminum or porcelain reflector, tank connection, swing joint, gas cut-off and stand pipe. The height is 28 inches to the center of the burner and the overall height with the standard tank is 66 inches.

Literature giving a complete description and prices of these flare lights, together with data on the Milburn line of portable carbide lights, may be secured direct from the manufacturer.

Standard for Half a Century
TANDEM MODELS
From 2 to 21 Tons
Buffalo-Springfield
GASOLINE OR DIESEL POWERED
3 WHEEL MODELS
From 5 to 14 Tons
Full Details will be sent upon Request
3-AXLE TANDEM
The Buffalo-Springfield Roller Co. SPRINGFIELD OHIO, U.S.A.

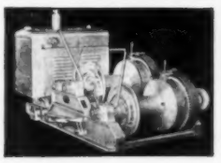


CMC New 14S End discharge Trailer. Big Daily Output With Lighter Weight and Fast Handling Ease.

The greatest line of profit-making equipment in CMC's history. New little Mixers—New big Mixers—each one built to do the job quicker, easier. New equipment that puts extra dollars into the profit column. See this new line—it's a world beater.

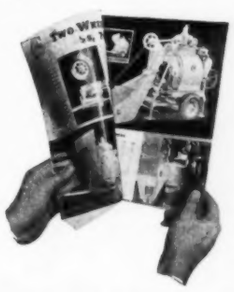
CMC Equipment will be exhibited at the Road Show San Francisco

- New Wonder 3 1/2 End Discharge Tilter
- New CMC 3 1/2 End Discharge Non-Tilt
- CMC Non-Tilt Trailers in 5s, 7s, 10s and 14s sizes
- CMC Wonder Plaster Mixers
- CMC Dual Prime Pumps from 1½" up to 10"
- CMC Hoists
- CMC Saw Rigs
- CMC Pneumatic Tired Carts and Wheelbarrows



NEW CATALOG!

Bigger and better than ever—packed with illustrations.



WRITE TODAY!

Get your copy of this new CMC book. Mailed free!

CONSTRUCTION MACHINERY COMPANY

Waterloo, Iowa

Smooth Rolling Began at the Edges with the Passages Lapping More Than Half the Rear-Wheel Width

Cement Stabilization Success in Maryland

(*Continued from page 42*)

ing. On hot, dry days, the cover material was dampened to prevent too rapid drying. The damp covering was left on a minimum of five days, then scraped off. The road was then opened to traffic.

Costs

The total cost of the soil-cement roadway was 39.7 cents per square yard. This cost includes all charges against construction such as cost of grade change, moving equipment to and from the project, materials, and the full time of all personnel and equipment, whether actually engaged in productive work or waiting for favorable weather. A breakdown of personnel and equipment costs is given in Table 1; and the details of total cost in Table 2.

TABLE I

PERSONNEL AND EQUIPMENT EMPLOYED ON THE JOB, AND PER HOUR COSTS

	Per Hour
1 Inspector	
2 Foremen	$.40 and $ .45
10 Laborers	.30 and .35
1 Caterpillar No. 11 Diesel Auto Patrol	.76
1 Operator for above	.45
1 10/20 McCormick-Deering tractor—pulling	.70
1 Orchard-type cultivator	.45
1 Caterpillar Thirty-Five tractor—pulling	.80
1 24" Killefer disc harrow	1.00
1 Pump (Supplying tank trucks)	.32
3 Operators for above units	.35
3 Trucks	$1.25, .90, and .90
3 Trucks—3 hrs. each day for cement	.90
1 1,000-gallon tank truck	1.25
1 750-gallon tank truck	1.00
2 Operators for above	.40
2 Sheepsfoot rollers	per week 24.00
1 Buffalo-Springfield roller	1.50

TABLE II

TOTAL COST OF THE PROJECT, AND PER SQUARE YARD COST OF BOTH PROCESSING AND SURFACING

EQUIPMENT	*Hours*	*Rate*	*Totals*	
Roller	143½	$1.50	$215.25	
Caterpillar Thirty-Five tractor	182½	.80	146.00	
10/20 tractor	169	.70	118.30	
One man Auto Patrol	175½	.76	133.38	
Killefer disc harrow	104½	1.00	104.50	
Orchard-type cultivator	94½	.45	42.53	
Rex pump	123	.32	39.36	
2 Hired trucks		2.50	390.01	
2 Trucks	276	1.00	276.00	
5 Trucks	244	.90	219.60	
2 Sheepsfoot rollers — hired 3 wks. at $24 per wk.			72.00	
TOTAL COST EQUIPMENT			$1756.93	$1756.93
LABOR				
4 Men	470½	$.45	$ 211.73	
5 Men	659	.40	263.60	
8 Men	1108½	.35	387.41	
6 Men	1091½	.30	327.45	
TOTAL COST LABOR			$1190.19	$1190.19
TOTAL COST EQUIPMENT AND LABOR			$2947.12	
TOTAL CEMENT			6460.13	
BUILDING PORTABLE LABORATORY & MISC. WORK			198.62	
MISC. EQUIPMENT & MATERIALS PURCHASES			68.14	
GRAND TOTAL SPENT			$9674.01	
COST PER SQUARE YARD, SOIL-CEMENT			$0.397	
" " " " OF ASPHALT SEAL			0.07	
TOTAL COST PER SQUARE YARD			$0.467	

Bituminous Surfacing

About 30 days after the road was opened, when traffic had cleaned the surface of all loose material, a top dressing was applied to the broomed soil-cement. This consisted of 1/3 gallon of RC-1 asphalt and a cover of 30 pounds of ⅜ to ¾-inch stone chips per square yard. This top dressing cost 7 cents per square yard.

Conclusions and Personnel

Our experience with our first soil-cement road has convinced us that this type of construction has wide application for light-traffic highways because of its low cost and its durability. We investigated soil-cement projects in other states before we built our own and we think so much of our first road that we have taken bids on another project 1.19 miles long, as well as on a grading and drainage project a mile long where soil-cement will be built this year. Furthermore, plans are under way for building still another section, 3 miles long, this year.

State Roads Commission employees in charge of this project were P. A. Morison, District Engineer; George H. Triece, Materials Engineer; George H. Dent, Assistant Materials Engineer; J. E. Wood, Resident Materials Engineer in charge of field tests; G. S. Somervell, Inspector; and Harry V. Jones, Senior Supervising Foreman.

A Hydraulic Scraper For Truck Mounting

A hydraulic scraper 8 or 9 feet wide, designed for mounting beneath the bodies of 1½-ton trucks, has been developed by Monarch Road Machinery Co., 327 Front Ave., N.W., Grand Rapids, Mich. The mounting of the scraper in this manner, with its high lift clearing the ground, makes possible quick transit from the garage to the job and the hydraulic control puts the scraper to work immediately. The controls are arranged compactly in the cab and when released the blade raises automatically to clear 8 inches above the road. The scraper is of all-steel construction, fully reversible, and may be mounted on any truck without drilling holes in the truck frame. Models 10 and 12 feet wide are also available for larger trucks.

Specifications and detailed information will be found in Bulletin No. 38 which may be secured direct from the manufacturer by mentioning this item.

Curing Concrete Paving With Calcium Chloride

Revisions of the specifications for curing concrete with calcium chloride as dry admixture for high-early-strength and cold weather concreting and as surface treatment for pavement curing have recently been adopted by the American Society for Testing materials.

The new specifications (A.S.T.M. Designation C82-38) cover the use of dry flake calcium chloride, as well as the solution form previously prescribed, by simply adding 1 to 2 pounds of calcium chloride per bag of cement used, placed in the skip with the aggregates, before mixing. This should prove of practical advantage in concreting by accelerating the setting and hardening of concrete.

Specifications for surface curing of pavements (A.S.T.M. Designation C83-38) allow the use of 1½ instead of 2 pounds of calcium chloride per square yard, to be spread over the surface following a minimum of 12 hours of wet burlap and sprinkling.

The complete specifications can be obtained from the Society's Headquarters, Philadelphia, Pa., at 25 cents each.

Note how the Galion sander spreads material two lanes wide on this highway

INSURE SAFE FLOW OF TRAFFIC

Essential to our very existence are open roads all the year around. Traffic must go on and safely. When ice and sleet threaten streets and highways then it's time to use a Galion highway sander.

By spreading sand, slag, chips, rock salt or calcium chloride on those hazardous roads . . . *two lanes wide* in one trip . . . you can insure a safe flow of highway transportation. The Galion sander will do the trick.

To further help you give the "all's clear" signal in winter, Galion offers an efficient snow plow attachment for use in combination with a Galion motor grader, the latter being used for year-round maintenance.

Send for complete data covering these units which do so much for so little.

By raising truck body, sander is put into operation for spreading

When truck body is lowered, sander is in position for transit

The Galion Iron Works & Mfg. Co.
Main Office & Works: Galion, Ohio
Export Division: Columbus, Ohio

KINNEY REPRESENTATIVES AT BOOTH B-43 AT THE ROAD SHOW

Representatives of the Kinney Mfg. Co. will be at Booth B-43 at the Road Show ready to point out the many advantages of Kinney Distributors to Owners, Engineers and Operators.

To the Owner, faced with a natural desire for profitable operation, they will emphasize the alloy steel tank which reduces the "dead" weight by 500 lbs. (on the 1,000-gallon size)! —and the economical use of materials due to the quick stopping and starting, air operated, spray control; and the accuracy of the Kinney pump as a meter.

To the Engineer, interested in accurate application, Kinney representatives will also emphasize quick starting and stopping; the full spray even at the end nozzles; large-capacity Kinney pump; efficient heating unit, and tachometers.

Operators will be directly interested in the safety and easy handling features: fuel tank well away from the burners; ladders, and hand rails; relief valves vents, and the inside closing valve.

Of general interest to all, is the fact that Kinney Engineers rely on proved equipment — Westinghouse Standard Air Brake diaphragms to control spray; and Ford 60-hp. engine for which service is universally available.

Ask for Bulletin A

KINNEY MANUFACTURING CO.
3521 Washington St., Boston, Mass.

CHICAGO'S Outstanding Hotel Location
DEARBORN AT JACKSON BLVD.

Only half a block from State Street shopping center—directly across from the United States Post Office and Federal Building. One block from Financial District and Board of Trade—easy access to all railroad stations and wholesale market district. Its perfect location is one of the reasons why so many visitors choose

HOTEL GREAT NORTHERN
One of the 14 ALBERT PICK HOTELS

The Marshall Field Estate has spared no expense in transforming the Great Northern into Chicago's hotel of tomorrow...completely modernized, redecorated and refurnished...featuring every fine service and facility.

400 ROOMS $2.50 400 BATHS from single
HAROLD R. PETERSEN, Manager

Road Organization In Lee County, Fla.

W. Glenn Gibson, County Engineer, Interviewed On Equipment and Recent Road And Drainage Work

(Photo on page 52)

✦ LEE County, Florida, borders the Gulf of Mexico and the Caloosahatchee River in the southwestern portion of the peninsula. Fort Myers, long the winter home of Thomas A. Edison and of Henry Ford, is the county seat. The county has an area of 1,188 square miles and there are approximately 300 miles of county roads in the five Commissioners' Districts.

Each District maintains its own roads under the direction of its Commissioner, with a Foreman and an average of six men and a varying number of district trucks, graders and drags. The County Engineer acts in an advisory capacity to the Districts on maintenance and handles all construction direct.

Finances

Each Florida county finances its roads in a different manner. In all counties the general income includes a return from the state pari-mutuel betting tax on dog and horse racing and on other games. This money is divided into 67 parts and distributed to the counties, approximating $27,000 per year. Lee County budgets this money to the road fund and augments it with an ad valorem tax on real estate amounting to $35,000 a year. This total income is divided five ways and allotted to the five districts. The salaries of the County Engineer and a few other county road employees are taken from the general county fund rather than from the road fund. Each piece of work is carefully entered on the accounts under its proper district.

All-County Equipment

Only recently the County made extensive purchases of new equipment to improve the character of the work and its speed. The present equipment that is termed "all-county equipment," because it is chiefly construction equipment and is used from time to time in the different districts under a rental arrangement, is as follows:

1 Caterpillar RD6 diesel tractor
1 Caterpillar 10-foot pulled grader
½-yard P & H dragline
8-ton Huber roller and scarifier
125-hp steam boiler for heating asphalt
1 asphalt pump
3 3,500-gallon asphalt storage tanks
1 700-gallon asphalt distributor
1 Briggs & Stratton jetting pump
1 Fairbanks-Morse jetting pump
1 McCormick-Deering double-disk harrow
1 5-ton International roller
10-ton La Crosse trailer for hauling tractor and dragline
110-gallon Littleford patching kettle
1 pile-driver with 1,100-pound drop hammer and 13-hp LeRoi engine
2 pick-up trucks, Plymouth and Chevrolet
1 Ford sedan for County Engineer

New Road Construction

The County completed last year a new farm-to-market road between State Roads 25 and 27 with a shell base and 16-foot pavement on a 28-foot grade. Labor and material were furnished by WPA, the county furnishing equipment only. The job was 6.25 miles in length and 1.5 miles of this was new location. The old road was only a narrow graded roadway.

For the length of the project the sand was from 6 inches to 10 feet in depth and some rock was encountered in the ditches. Dixie corrugated iron culverts were installed and one 45-foot and two 30-foot wood bridges were built with creosoted material. The grade was thrown up by the P & H dragline, hand labor and the grader to a width of 28 feet. The shell base was placed 16 feet wide and 9 inches thick, loose, and then compacted to 5½ inches by the Huber roller. This was given two shots of 0.33 gallon per square yard each of hot asphalt of about 85-100 penetration and blotted with sand between each application. The road was closed to traffic only from the time the asphalt was applied until the sand blotter was placed.

The ditches on this job average 2 feet below the top of the pavement, are 6 feet wide at the bottom and 12 feet wide at the top.

Major Drainage Project

An area of about 1,500 acres located about 3 miles east of Fort Myers had been subject to flood for many years during every major storm. A project was started early in 1938 to provide adequate drainage for this section, which has unusually good soil for crops.

A WPA project was set up to clear and grub the 2½ miles of new ditch for the full 60 feet of the right-of-way. The ditch itself has a 20-foot bottom, a 30-foot top and all material excavated by the County's P & H dragline was placed at least 3 feet back from the edge of the cut. The line of the ditch was run with regular highway curves. The excavator with its ½-yard P & H bucket moved 600 yards of material in an 8-hour day, working on mats and encountering many small trees and roots that had not been completely removed in the grubbing.

The project was set up to cost $18,000 but with the use of the dragline and the speed with which the organization worked the job was completed with a saving of $8,000.

Lighter-Weight Jack Of Malleable Iron

The newest Simplex screw jacks manufactured by Templeton, Kenly & Co., Inc., 1020 South Central Ave., Chicago, Ill., are made with bases of malleable iron, as it is tougher and less subject to breakage due to dropping or rough handling. The jacks are lighter in weight and a peephole in the malleable base enables the user to see how far the screw can safely be run out.

The manufacturer claims that friction is reduced 88 per cent because of the floating cap which rests on a chrome-molybdenum steel ball. This cap has a 9-degree float which allows for completely centering the load.

The principal sizes of Simplex screw jacks are now furnished with malleable bases. They are described in Bulletin SJ-39 which is available on request direct from the manufacturer by mentioning this item, or through CONTRACTORS AND ENGINEERS MONTHLY.

W. H. Root, Maintenance Engineer, Iowa State Highway Department, reported that a few years ago when the trucks used for snow removal were increased in power from 125 to 150 developed horsepower, the width of V-type plows was increased from 8 feet to 10 feet. Since this resulted in just as much stalling as with less powerful trucks, the State has returned to 7½ to 8-foot wide V-plows.

LANSING
3½ T-Mixer

Timken Roller Bearings
PNEUMATIC RUBBER TIRES

Quick trailing—fast production—better profits. WRITE for complete information.

LANSING COMPANY
LANSING, MICHIGAN
CHICAGO NEW YORK PHILADELPHIA KANSAS CITY SAN FRANCISCO BOSTON MINNEAPOLIS

UNION METAL Monotube Piles Used for New CLEVELAND BRIDGE

• Another important job goes Union Metal! Approximately 1100 Fluted Steel Monotube piles, running between 55 ft. and 60 ft. in length, support eight of the main piers for Cleveland's new $6,000,000 Main Avenue Bridge.

Once again, Fluted Steel Monotubes demonstrated their time and money-saving qualities. These sturdy, heavy-walled piles were handled quickly without the aid of special equipment. They were driven speedily with a crawler crane equipped with leads and a No. 1 Vulcan hammer. No piles in any one footer were filled with concrete until all had been driven and inspected.

Whether your piling requirements are large or small, it is just good economy to use Fluted Steel Monotubes for cast-in-place concrete piles. Write today for catalog No. 68 containing complete product and engineering data.

THE UNION METAL MANUFACTURING CO.
Canton, Ohio

Partial view of Fluted Monotube piles driven in footer to support piers for Cleveland's Main Avenue Bridge. Piling contractor—Lake States Engr. Co., Chicago.

CONTRACTORS AND ENGINEERS MONTHLY
470 Fourth Avenue, New York

Enclosed is my remittance of $2 for the next twelve issues of CONTRACTORS AND ENGINEERS MONTHLY.

Name _____

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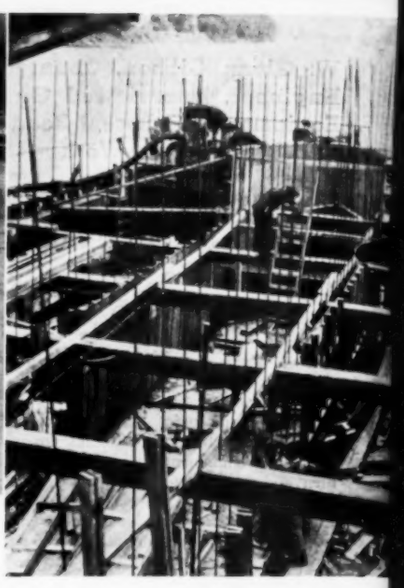
N. B. A two dollar bill, check or postage stamps will be entirely acceptable.

Contractors and Engineers Monthly



C. & E. M. Photos

Left, T. Stuart & Son's Batching Plant and Pumpcrete Well-Housed to Permit Winter Concreting on the Coolidge Bridge Across the Connecticut River at Northampton, Mass. Above, the 7-Inch Concrete Line. Right, Setting Forms for the Third Lift on Pier 3. See Page 1.

Damp Mixing with a Field Cultivator and Disc Harrow on the First Soil-Cement Road in Maryland. See Page 11.

C. & E. M. Photo

The Fast Shoulder-Sloping Outfit Used by Ziegler Construction Co. Near Tupelo, Miss. See Page 2.

An Air View of the New Drainage Ditch, Constructed As a WPA Project by Lee County, Florida, to Remove Many Bad Wet Spots and End Flooding. Fish Fries Speeded This Work. See Pages 23 and 51.

Knudsen-Burns Construction Co., Denver, Colo., Used This Iowa Crushing Plant with an Allis-Chalmers Power Unit for Producing Road Gravel Between Yampa and Gore Pass, Colorado.

One of the New Caterpillar No. 12 Auto Patrols, Owned by Douglas County, Colorado, Clears More Than 3 Miles of Road an Hour, Plowing Drifted Snow 2 to 3 Feet Deep at 6,000-Foot Elevation.

The Immediate Benefits of Safety Lighting Are Shown Forcefully in the Comparison of These Views Taken at the Same Place on New Jersey Route 23 Between Verona and Cedar Grove. Other Extremely Important Benefits Are Shown in the Greatly Reduced Fatality Rate. See Page 24.

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